UNITED STATES ARMY AUGUST 1968

AVIATION DIGEST

See page 10

UNITED STATES ARMY AVIATION DIGEST

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15

20

36

VIEWS FROM READERS 1

DIRECT FIRE SUPPORT — HELICOPTER STYLE 2
COL Kenneth D. Mertel

DEMPSEY FIELD 9

HURRICANES 10

CHANGE OF FLIGHT PLAN, LTC John L. Jennings 15

TOMORROW'S COMMITMENT — ALL FLYABLE AIRCRAFT 17
MAJ Earl E. Witcher

NIGHT TACTICAL APPROACHES AND FORMATION FLYING 20
CW2 Barry R. Billman

AN AVLABS' REPORT ON FAILURE DETECTION PROGRAMS 23
Leonard M. Bartone

THE FLIGHT INSTRUCTOR — A PROFESSIONAL 26
MAJ Bobby A. Ramsey

COMMAND AND CONTROL HELICOPTER 29
MAJ Paul V. Schreck, Jr.

MONSOON NIGHTMARE OVER TUY HOA 34
CPT Salvatore Casarona

PERSONAL EQUIPMENT SENSE, MAJ Chester Goolrick 36

WHAT RULES? 52

BAMBOO CURTAIN 59

WHY PARTS FAIL, Ted Kontos 60

COBRA FIREPOWER BOLSTERED 64

I AM GOING IN AFTER MY MEN Inside Back

SEASON FORECAST Back Cover

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The mission of the U. S. ARMY AVIATION DIGEST is to provide information of an operational or functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine, and other related data.

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Articles, photos, and items of interest on Army aviation are invited. Direct communication is authorized to: Editor, U. S. Army Aviation Digest, Fort Rucker, Ala. 36360.

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VIEWS FROM READERS

STANDARDIZATION

Sir:

Reference "Standardization" on page 36 of the May 1968 issue of the AVIATION DIGEST.

It is certainly strange that a Bird Dog, Huey or what have you, requires varying operational techniques during its worldwide assignments. Perhaps the problem lies not with the machine but with the man. Since our aircraft are basically standard between type, model and series, and operate under known performance limits predicated on the physical laws of science, why all the tinkering of checklists under the guise of standardization?

It appears that once an aviator achieves a position of responsibility concerning a particular aircraft, he then becomes known as the "expert." We now call him "the standardization pilot" and many of these pseudo experts feel compelled, as if by some strange disease, to inject their expertise into the standards established by the manufacturer and schools. Perhaps he is correct, and the changes are appropriate, and safety is promoted. But, wouldn't the rest of us benefit as well?

Also of importance is that all the varying worldwide modifications of the official checklists found in the Dash 10 and Dash 10 CL are seldom forwarded in the form of an official recommendation. Yet, this is the proper avenue. If the official Department of the Army publication concerning an aircraft is not correct, then an obligation exists for the individual to speak out officially.

With specific reference to the article by Captain Otersen, perhaps it is an overdramatization of the standardization problem. But, if so, only to a slight degree. I can only urge all commanders to enforce mandatory use of the "Bible," our Dash 10s and Dash 10 CLs. If a change is needed, let it be for the benefit of all operators.

Standardization is a key element toward safe and economical operations. Let's be standard worldwide.

COL Curtis L. Hankins
Chief, Aviation Division, ODCSO&T
Fort Sam Houston, Texas 78234

Colonel Hankins' letter adequately expresses the concern that many aviators have over the perplexing persistency with which variations exist in standardization procedures. As noted, some units compile SOPs that encompass items adequately covered in operators manuals and in some cases, these SOPs do not conform exactly to prescribed procedures.

As stated by Colonel Hankins, it is up to commanders to enforce mandatory use of the -10 and -10CL. If a change is needed, let it be for the benefit of all operators. Recommended improvements should be reported on DA Form 2028 by the user and forwarded directly to: Commanding General, USAAVCOM, P. O. Box 209, Main Office, St. Louis, Mo. 63166.

There are many specific practices that vary from the operators manuals besides those mentioned by Captain Otersen in his article. Two of the most flagrant are: one unit uses climb power settings of 3000 RPM and 40" HG MP for U-8 aircraft, and teaches these in transition training, and at least one gunship platoon (UH-1C) has dictated a climb airspeed of 80 knots.—The Editors

2107 RETIRES

Sir:

Thought you might be interested in the current status and whereabouts of UH-1D, 62-2107. [See "Letters," Dec 1967 DIGEST.] Attached is a copy of a local release which contains about all the information we were able to glean from her records.

Enjoy the articles published in the DIGEST. It's unfortunate that more people in the field don't find time to contribute material because there are numerous ingenious solutions to difficult problems being practiced over here. And many have application worldwide. I'd personally enjoy seeing a capsule historical summary of the various aviation units currently in Vietnam.

MAJ Stephen L. Smith
483rd Transportation Detachment
APO San Francisco 96240

★ ★ ★

The number two production line "D" model has been retired from an active combat duty status. UH-1D, SN 62-2107 departed the 281st Assault Helicopter Company's Intruder Pad on 27 April 1968 with Warrant Officer Wendell Allen at the controls, bound for Qui Nhon and subsequent DEROS to Corpus Christi for a much deserved R & R (rest & rebuild). 2107, known here as "The Original Bone" began her tour with The Army Test Activity at Edwards Air Force Base, Calif. Although her historical records were nearly as battered as her airframe, it is believed she spent time in Alaska and at Yuma, participating in a variety of test projects. She joined the 11th Air Assault Division and deployed to Vietnam with the 1st Air Cavalry Division. According to reports in an earlier AVIATION DIGEST, she survived that tour relatively unscathed.

Since departing the Sky Soldiers' camp, she has led an obscure existence as a float aircraft in various maintenance units throughout the Republic. Although her tenure with the 281st AHC was brief, her assignment was historic. According to Major Stephen L. Smith, the Intruder Maintenance Officer, "It marked the only time that maintenance had undisputed possession of a mission ready aircraft. No one else would fly her!" It was only appropriate that 62-2107 should depart the company with 2107 total hours on her logbook.

Direct Fire Support

(Helicopter Style)

There was a day when many doubted the helicopter's capability to provide direct fire support. But armed helicopters have since proven their value in this respect. The author writes about the first documented use of the armed helicopter in a purely fire support role. The action occurred in the Republic of Vietnam in 1963

Colonel Kenneth D. Mertel

THE FIRST DOCUMENTED example of direct fire support by U. S. Army armed helicopters in the war against the Viet Cong (VC) occurred at Pho Binh, Vietnam, on 22 July 63.

Elements of the 33rd Vietnamese Ranger Battalion (two companies, the 1st and 2nd, plus the battalion headquarters) departed base camp at 0730 hours on that date for a reconnaissance in force. The first enemy contact was a VC outguard encountered in a clearing. The VC fired several shots before withdrawing. The rangers did not return fire since the VC was accompanied by a woman.

The battalion continued to move southwest and at 1230 hours approached a roadblock (logs across the road, point A on map). An estimated three VC were defending the roadblock. A small skirmish resulted in the withdrawal of the enemy, with one VC probably wounded. One ranger was slightly wounded when his submachinegun was hit, splitting his finger.

The battalion moved on down the road, with the 1st Ranger Company deployed on the left, the 2nd Ranger Company on the right. A village was reached at 1240 hours. The village was searched and several houses burned and caves destroyed by demolitions. (Note: These demolitions alerted the VC at the next point of contact on the river.) The rangers continued to march southwest on two axes, until reaching an open valley approximately 1 kilometer wide with a vegetated stream bed running down the center.

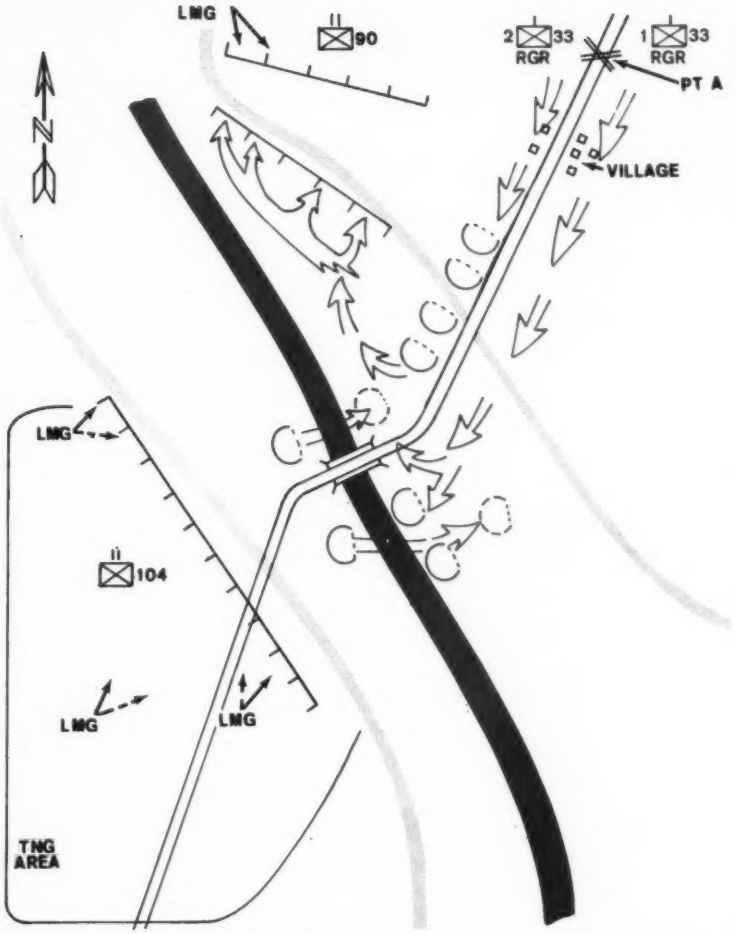
At this point the battalion commander ordered both companies to turn north, with the 2nd Ranger Company on the right, east of the stream and the 1st Ranger Company on the left, west of the stream. The 2nd Ranger Company on the east completed its turn to the north, platoons in column. The lead platoon reached the woodline (100 meters from the river) while the 1st Ranger Company was beginning to cross the stream. Two platoons of the 1st Ranger Company crossed the stream, one on the right of the road, one on the left. The stream averaged 20 feet in width and was 2-3 feet deep.

At this time, approximately 1330 hours, elements of the 104th Viet Cong Battalion, in position on the west side of the stream directly opposite the 1st Ranger Company, opened fire with automatic weapons including light machineguns (LMG) located directly in front of the left platoon. Elements of the 1st Ranger Company were caught in the open between the stream and the woods on the west side. They immediately returned fire and began a withdrawal to the east side of the stream to join the remainder of the company. The company commander was hit four times from the initial burst of machinegun fire. A total of five friendly killed and six wounded occurred during this phase.

In the meantime, the Viet Cong began action against the 2nd Ranger Company from elements of the 104th Battalion, west of the stream, and the 90th Battalion on the east side of the stream, immediately to the north. The 2nd Ranger Company returned fire and, followed by elements of the battalion headquarters, deployed into positions facing the enemy.

Initially the 2nd Ranger Company had difficulty in bringing maximum small arms fire to bear on the VC due to readjusting from a column of platoons to a skirmish line. Several rounds of VC 81-mm mortar fire hit the battalion CP and resulted in 1 killed and 15 wounded.

The 1st Ranger Company successfully withdrew the remainder



of the two platoons east of the stream to rejoin the company while the 2nd Ranger Company engaged in a counterattack against the 90th VC Battalion.

A requested airstrike arrived overhead at 1540 hours. The two T-28s accompanied by a Vietnamese Air Force (VNAF) O-1 directed fire (fifty-five 2.75" rockets and 750 rounds .50 caliber) to the rear of the 90th VC Battalion (unobserved) with unknown effect. The battalion commander thought this strike was too far away and accomplished little. He pointed out that VNAF regulations prohibited a strike less than 800 meters from friendly troops without his specific approval. During the ensuing action, artillery fires from the two 155 howitzers located at Dinh Thanh were brought into action. A reported 88 rounds were fired; however, less than 10 rounds were observed by the rangers, with little results.

The commanding general of the 5th Infantry Division requested armed helicopters (1515 hours) to conduct an armed reconnaissance of the area of operation and to provide assistance to the 33rd Ranger Battalion. This request was approved by III ARVN Corps.

At 1520 hours the Utility Tactical Transport Company (UTT), attached to the 145th Combat Aviation Battalion, was alerted. The 2nd Platoon, with armed UH-1B helicopters, departed its home base at Tan Son Nhut at 1540 hours and arrived at 5th Division Headquarters at Bien Hoa at 1555. Authority for armed helicopter employment was granted by U. S. Army Support Command, Vietnam.

Captain Calvin R. Bean, the UTT 2nd platoon leader, received a briefing and instructions from 5th Division personnel. ARVN observers were picked up and the UTT platoon was briefed by Captain Bean. The UTT platoon, accompanied by the 5th Division assistant G-3, departed Bien Hoa at 1600 hours en route to the objective area. Further en route the Military Assistance Advisory Group (MAAG) advisor at Ben Cat was contacted by FM radio, and visual signals to be used in the objective area were coordinated.

At 1620 hours, the UTT platoon arrived at the position 3,000 meters east of the area of operation. Team Bravo (two aircraft) proceeded to the objective to conduct an initial reconnaissance and determine both the enemy and friendly situations. An initial attempt to contact Captain Lucas, the 33rd Ranger Battalion advisor, by FM radio failed. Communication was established a few minutes later.

At 1623, team Bravo located the positions of the 1st and 2nd Ranger Company and those of the two VC battalions. During reconnaissance, ground fire was received from both VC positions. At the request of the assistant G-3, the armed helicopters returned fire.

The first firing run, at 1625 from the northeast, knocked out the LMG in the 104th Battalion area. A series of firing runs were continued along the entire west bank of the stream where the 104th was positioned. A large number of VC were observed in this area in the edge of the woods; it was the

main enemy force that was engaged in action with the 1st Ranger Company.

At 1635, Captain Bean's helicopter received one hit in the fuel tank by enemy fire. The helicopter was thought to be on fire; however, the large smoke cloud proved to be vaporized fuel leaking from the damaged tank. Captain Bean turned command of the platoon over to the Alpha team leader and proceeded to the Pho Binh ranger compound where he safely landed the damaged helicopter. The remainder of the UTT platoon continued firing runs with both 2.75" rockets and 7.62 M-60 machineguns until ammunition was expended and fuel was low.

A radio call was received from Captain Lucas at 1640 hours, indicating a need for evacuation of casualties. Medical evacuation was initiated by one fire team, landing to pick up casualties while the other team provided suppressive fires. Then the second fire team landed to retrieve casualties while the first fire team provided protection.

The UTT platoon (-) departed the objective area at 1650 hours with 19 seriously wounded rangers

One fire team picks up casualties (above) while another provides suppressive fire. As the battle rages an ARVN CH-34 (below) arrives to assist with medical evacuation.

aboard the four helicopters. En route, the UTT acting platoon leader reported the damaged helicopter to the UTT Company and requested assistance. Another armed helicopter en route to Ben Cat with additional rockets was contacted and rerouted to Pho Binh to provide security for the downed aircraft. The platoon landed at Tan Son Nhut at 1720 hours, released casualties to medical personnel, rearmed and refueled the aircraft.

On departure of the UTT platoon, at 1650 hours, a B-26 light bomber arrived over the objective area and conducted a series of low-level attacks behind VC positions. The Viet Cong, in close contact with the ranger battalion, prevented the B-26 from delivering effective close supporting fires upon the VC. Two T-28s were in the area at the same time (1650) and expended their ordnance near the VC positions. Proximity of the Viet Cong to the rangers prevented effective use of the T-28s, with actual results unobserved.

The VC ground action diminished in the 104th Viet Cong Battalion area as the armed helicopters pressed their devastating attack. The stream separating the 1st Ranger Company from the 104th Battalion provided an excellent way to determine the exact enemy lines. It enabled the armed helicopters to place close, accurate, plunging and enfilade fire on the VC without endangering the rangers. Enemy positions could not clearly be defined in the 2nd Ranger Company area, where hand to hand combat precluded identification of friend from foe. As a result, armed helicopters were not employed in this area until their return the second time after rearming.

At 1630 hours, the commanding general, 5th Infantry Division, requested helicopter transports to airlift 100 troops to reinforce the nearby strategic hamlet vic Vang Huong believed to be in danger from enemy contact. The request was approved by III ARVN Corps. Ten CH-21s from the 120th Airmobile Company, part of the 145th Combat Aviation Battalion, departed Tan Son Nhut at 1725 hours and proceeded to Ben Cat to load the troops.

Fire team Bravo from the 2nd UTT platoon departed home base at 1750 hours, proceeded to Ben Cat to join up with the CH-21s to furnish protection during the troop lift. Fire team Alpha departed home base at 1800 hours en route to Ben Cat. At 1825 an element of team Bravo en route to the landing zone picked up Captain Bean at Pho Binh. He again assumed command of the platoon. At 1820 hours

The VC began breaking contact after the first armed helicopter attack

the troop lift departed Ben Cat escorted by both fire teams, and arrived at the landing zone at 1830. The troop lift completed, the transports and escorts departed the landing zone at 1832.

In the meantime, requests for additional emergency medical evacuation from the battalion commander of the 33rd Ranger Battalion resulted in the arrival of one ARVN CH-34 at 1745 hours to evacuate casualties. Two CH-21 helicopters arrived at 1835 hours for further evacuation missions. The UTT platoon (-) escorted the two CH-21 helicopters.

After departure of the CH-21s with the casualties, Captain Lucas contacted Captain Bean by radio and requested further direct helicopter fire support against the known Viet Cong strongpoints which threatened his position and the possible further evacuation of casualties. The assistant G-3, still with the helicopters, approved the request for assistance.

Rocket and machinegun attack was initiated against the 104th VC Battalion and the rear portion of the 90th VC Battalion. The Viet Cong fire became sporadic, finally diminishing to little or nothing. However, the armed helicopters continued to receive some fire farther to the west (elements of the withdrawing 104th VC Battalion). At 1850 hours the UTT platoon, low on fuel, departed the area.

It was apparent that after the first attack by the armed helicopters, the VC began to break contact. This break was expedited by the return of the armed helicopters the second time. A total of 153 2.75" rockets, 25,500 rounds 7.62 mm machinegun, and 1,650 rounds of small arms ammunition were expended during the entire action, all observed and controlled fire.

The withdrawal by the VC and disapproval (by 5th Inf Div) of a requested airlift for reinforcement of one additional ranger company at Long Hguyena, organic to the 33rd Ranger Battalion, prevented pursuit and exploitation of the retreating VC. The battalion commander ordered the ranger battalion to withdraw to its base at Pho Binh. The withdrawal began at 1900 hours.

At 1852 the MAAG advisor at Ben Cat contacted the departing UTT platoon leader and requested emergency airlift of ammunition. The message was relayed by Captain Bean to a flight of four CH-21s from the 120th Airmobile Company returning to Saigon from the previous troop lift. The CH-21 flight returned to Ben Cat, arriving at 1910 hours, to load 2,000 pounds of ammunition to be delivered to the 33rd Ranger Battalion at a point in their withdrawal route.

The ammunition was dispatched, but could not be delivered to the designated area because of deteriorating weather conditions and rapidly approaching darkness. The ammunition was delivered to Pho Binh (at 1925 hours), home base of the 33rd Ranger Battalion, on receipt of radio instructions from Captain Lucas. The CH-21s were escorted by team Alpha from the UTT platoon, in spite of critical fuel status. This team was relieved by another UTT element (arriving from Saigon) at 1855, who continued escort for the flight of CH-21s with final return to Saigon at about 1955 hours.

The ranger battalion (-) arrived back at Pho Binh at 0400 hours on 23 July 63, after a difficult night march over hazardous terrain. The march was materially assisted by numerous flares dropped by a C-47 flare ship between 0130 and 0330 hours.

The area occupied by the 104th VC Battalion later proved to be a training area occupied for a significant period of time. The 32nd Ranger Battalion (Captain Billy Thames, advisor) entered this area 23 hours later, at 1430 hours 23 July, and remained there for two days. They encountered numerous hand grenades and 60 mm booby traps protected by snipers.

The area included extensive foxholes, some with partial overhead cover. Indications of grenade, rifle marksmanship and demolition training were in evidence. Numerous items of individual equipment were found, including ponchos and individual containers of rice. Bloodstains were in evidence throughout the entire training area. Fragments of shattered rockets were thick within the emplacements and foxholes. The earth throughout the area was torn and ripped by machinegun and rocket fire.

One fresh grave was found, containing 10 bodies. Conditions of the training area (partially finished meals and preparations for a celebration of some kind) indicated that the VC had not prepared a deliberate preplanned ambush, but were probably alerted by the demolitions in the village and earlier contact with the outguard and roadblock. This warning enabled the VC to occupy the perimeter along the west side of the stream before arrival of the leading elements of the 33rd Ranger Battalion, thus giving the initial advantage of surprise to the VC. A similar engagement occurred between the 32nd Ranger Battalion and a VC unit at this same location on 11 June 63.

The 104th VC Battalion, part of the 58th Regiment, had an estimated strength of 350 men, three 81-mm mortars, three LMGs and an unknown number of grenade launchers. They were well equipped, well trained and aggressive.

The 90th VC Battalion also part of the 58th Regiment, had an estimated strength of 250 men, one LMG, and no mortars. Their training was only fair and this unit was not considered aggressive or effective. These two units were located in an area that was known

Army CH-21's (left) carry South Vietnamese troops into battle in 1963 . . .

to be full of VC sympathizers. The U. S. advisors of the 32nd and 33rd Ranger Battalions believed that the VC had withdrawn to the Ho Bo area.

The strength figures and numbers and types of weapons of the two VC battalions were interesting in comparison with the opposing ARVN ranger companies. Each ranger company averages 100 men and two 60-mm mortars. In addition, the small headquarters of the 33rd Ranger Battalion included two .30 caliber LMGs.

As a result of the actions of the 33rd Ranger Battalion on the 22nd and the sweep through the area on the 23rd by the 32nd Ranger Battalion, a total of two shotguns, 1 antitank rocket, one MAS 36 (rifle), one MAS 49 (submachinegun), and 20 kilos of documents were recovered. Friendly losses to the 33rd Ranger Battalion (-) totaled 8 killed and 34 wounded. Enemy losses were 132 killed and an unknown number wounded.

Enemy losses were not determined from actual body count (bodies remaining on the scene of action), but by eye witness reports of U. S. advisors and ARVN ranger officers.

Captain Lucas and Captain Thu (battalion commander) stated that 37 of the enemy killed in the area of the 90th VC Battalion resulted largely from the assaults and fire of the 2nd Ranger Company. A total of 75 enemy killed were in the area of the 104th VC Battalion, west of the stream and were attributed to the devastating machinegun and rocket fire of the armed helicopters.

One armed helicopter was forced down (hit in the fuel tank) and executed a forced landing at Pho Binh. The helicopter was repaired and flown out the next day. Two other armed helicopters received one hit each, with no serious consequences.

Radio communications between the UTT platoon and the 33rd Ranger Battalion were excellent throughout, using FM radio. Captain Bean and the ranger advisor, Captain Lucas, were in constant radio communication. This aided materially in identifying enemy targets and arranging for emergency evacuations of casualties. Communications with the artillery were poor and ineffectual.

A VNAF O-1 accompanying the T-28s on the first mission was in communication part of the time with the 33rd Ranger Battalion. An O-1 from the 73rd Surveillance and Reconnaissance Company (5th Inf Div) was in the area and assisted in radio relay, directing medical evacuation helicopters as well as adjustment of artillery (1500-1800 and 1830-1945). A third O-1, acting as command and control ship for the helicopter transport lift, was in the area at the time of the troop lift and air resupply of ammunition.

A later study of the battle revealed that the 33rd Ranger Battalion (-) was surprised by a VC force considerably larger in size (104th VC Battalion and 90th VC Battalion) with many advantages of terrain, placement of troops and firepower.

The "ambush" was not preplanned, but was the result of a chance meeting caused by the advance of the 33rd Ranger Battalion into the training and bivouac area of the 104th VC Battalion. The VC had the advantage of "warning" from the outguard and roadblock action as well as demolitions in the village area and were able to hastily occupy previously prepared positions.

The 1st Ranger Company was able to withdraw to the east side

. . . while newly introduced Hueys destroy the VC with superior firepower

of the river and conduct an effective defense. The 2nd Ranger Company was able to deploy with difficulty and take up positions against the 90th VC Battalion where a series of assault and counterassault actions occurred.

Artillery, although within range of the area of operations, was ineffectual and did little to contribute to the action despite the large number of rounds reported fired.

The strikes of the four T-28s and one B-26 proved ineffectual since the majority of ordnance was dropped in rear of the VC positions with unobserved results.

Radio communications between the leader of the UTT platoon and the advisor of the 33rd Ranger Battalion assured rapid designation of targets and excellent coordination of efforts.

Initial delay in employment of the UTT platoon was due to the requirement to pick up ARVN observers at Bien Hoa.

Delay in return of the UTT platoon the second time was caused by unavailability of fuel and ammunition at Ben Cat, requiring the platoon to proceed to Saigon to rearm and refuel.

Techniques of target identification can be improved. The stream between the 1st Ranger Company and 104th VC Battalion facilitated accurate and instantaneous fire on the VC. The difficulty in determining friendly and enemy positions between the 90th VC Battalion and the 2nd Ranger Company precluded effective use of UTT, artillery, or other forms of supporting fire for fear of hitting friendly troops.

Reconnaissance aircraft (O-1) were not available at all times to assist the 33rd Ranger Battalion. Aircraft can be used to excellent advantage to reconnoiter the route of advance for a reconnaissance in force such as that executed by the 33rd Ranger Battalion, as well as to facilitate radio communication, mark targets, adjust artillery and locate friendly ground elements.

Maximum effective use of transport helicopters was not achieved. Ten transports were requested to move 100 troops; however, only 67 men were actually available to be moved. The resupply mission was flown as an emergency mission requested by the advisor at Ben Cat after earlier disapproval by 5th Infantry Division. Had the resupply mission been anticipated or approved earlier, it could have been flown at the time of the troop lift. Coordinate location of landing zone for troop lift was transmitted in the clear by the advisor at Ben Cat, possibly compromising this location to the enemy and potential counteraction. In retrospect, it is apparent that the transport helicopters could have been used to better advantage to reinforce the 33rd Ranger Battalion. This might have permitted an attack on the VC and pursuit as they broke action.

The awesome firepower of the helicopter has a devastating effect on a VC assault

The rapid response and timely arrival of the UTT platoon at the area of operations, the rapid evaluation of the situation, and precise fixing of the VC positions due to the unique capabilities of the armed helicopter enabled the UTT platoon to bring accurate and devastating rocket and machinegun fire upon the enemy, killing and wounding large numbers. The VC tactic of "hugging" ARVN troops during an airstrike proved ineffective against armed helicopters in the 104th VC Battalion area. The effect on the VC of the sudden appearance of such awesome firepower as they were pressing a successful assault on the outnumbered ranger companies cannot be measured. There is little doubt that the UTT platoon forced the withdrawal of the VC and prevented large numbers of ranger casualties in this first good example of direct fire support, helicopter style.

Dempsey Field

Dempsey Army Heliport is the U. S. Army Primary Helicopter Center's newest heliport. The $3.8 million heliport was constructed to keep pace with the rapidly expanding training program at Fort Wolters, Texas

A HURRY-UP expansion job at the U. S. Army Primary Helicopter Center at Fort Wolters, Texas, has been completed in near-record time. To increase the flow of helicopter pilots to Vietnam, Dempsey Army Heliport, 12 miles from the main post complex, was carved out of 160 acres of rolling prairie near Mineral Wells, Texas.

In the old days the local citizens, at the drop of a Stetson hat, organized posses to hunt down the horse thieving varmints and cattle rustlers who roamed the area. Today, the emphasis is on turning out crack warrant officer helicopter pilots to flush the Viet Cong out of the jungles of Vietnam. There helicopters not only serve as the soldier's horse, but they also are used as trucks, ambulances, artillery pieces, and flying cranes.

Dempsey Field is part of a $10 million overall expansion program at Fort Wolters to provide facilities that will increase the number of helicopter pilots going through the 16-week training by 50 percent.

The training program at Wolters has grown rapidly since it was begun in November 1956. At first, it set out to produce 100 aviators each month. This was not enough. Soon it was expanded to 290 aviators a month, then upped to 375 and finally to 575.

This fivefold increase called for a much larger training facility than was available. The Army Engineers were called in to design the new field and other necessary facilities. The field was named for the late COL Jack Taylor Dempsey who died on Easter Sunday 1967 in Vietnam. Colonel Dempsey was killed trying to rescue crewmembers of helicopters shot down by Viet Cong ground fire.

The construction of the field was under the supervision of the Fort Worth District Engineer, U. S. Army Corps of Engineers. A $3.8 million contract was awarded in June 1967 and the project was completed in January 1968.

Before the contract was awarded, the chief of the Construction Division, Fort Worth District, called a meeting with the contractors bidding on the project to outline the critical nature of the project, and to stress the short time frame.

The successful bidder was required to commence work immediately after receiving notice to proceed and to complete the entire project — ready for operation — in slightly more than 6 months' time. The job could not be based on a normal 40-hour week. Each shift worked 10 or more hours every day.

Also, there were problems of availability of the right supplies and materials. Because of the limited time available, it was decided to use prefabricated structures for the maintenance hangar and a two-story building for briefing student pilots. The contractor had to locate a supplier who could fabricate, deliver, and erect the buildings on schedule

The maintenance hangar, 90 feet wide and 913 feet long, includes the control tower. Placed in the middle of the heliport's main apron, it can accommodate 475 aircraft at a time.

The nearby briefing building includes 16 briefing and 16 instructor student rooms. It can handle up to 880 pilots and their instructors.

The main apron of the field is 3,285 feet long and 1,300 feet wide. The project also included construction of a 1,000-car parking lot; base utilities, including a 200,000-gallon water tower; and a separate weather station for the heliport.

With the completion of Dempsey Field, the Primary Helicopter Training Center can now meet all the present requirements and those of the foreseeable future

More on Dempsey Army Heliport on inside back cover

Hurricanes

The developing airmobile capability in the Army is usually associated with tactical operations. But today it is proving invaluable in the foretold mercy missions that follow in the wake of hurricanes

NO ONE REALLY knows the extent of damage hurricanes have caused the United States, as records were not kept until after 1890. But in those of recent years Hurricane Beulah ranks as one of the most destructive, causing an estimated one billion dollars damage to southwest Texas.

Traditionally, the Army has a role in assisting civil authorities in national disasters. Primary responsibility for coping with the results of these disasters lies with State and local authorities and other organizations, such as the American Red Cross. However, these organizations usually do not have the communications, transportation, manpower, and other resources needed; so they call on the Army, as well as the Air Force, Navy, Marines, and Coast Guard for help.

Often as not, the disaster occurs in such an area and under such conditions that the Army with its ground transportation is relegated to the role of logistical support, while the Air Force, with its airplanes, and the Navy, with its airplanes, ships and boats, conduct the more glamorous and newsworthy role of rescue.

It was different with Beulah in 1967. For one thing, the hurricane struck in an area where the Army could easily deploy its units. For the first time the Army was able to use its versatile helicopters, which are far better for this kind of work than airplanes that require long runways for landing and boats that need relatively calm waters for operating.

Hurricane Beulah struck the Texas and Mexican Gulf Coast at Brownsville, about 135 miles southwest of Corpus Christi, Texas. At Corpus Christi, the Army has its huge Aeronautical Depot Maintenance Center that restores damaged helicopters.

At the time the hurricane struck, the depot had finished repairing eleven UH-1Ds and four CH-47s for Hunter Army Airfield, Ga. Furthermore, the fly-away crews were on hand to ferry them to Hunter.

It was decided to hold these helicopters and crews at Corpus Christi and with additional helicopters from nearby Army posts, along with various ground units and personnel, form a unit to help the hurricane victims. The unit was called Task Force Bravo and was commanded by MG Richard G. Stillwell, commanding general of the 1st Armored Division from Fort Hood.

The headquarters for the task force was first set up at the Naval Air Station at Corpus Christi. As soon as the 100 mile plus winds had subsided, the task force moved to the Harlingen Industrial Airport at Harlingen, Texas, which was near the center of the disaster area.

But the humanitarian aspects of the situation couldn't wait for a headquarters to be established. Even before the hurricane came inland from the Gulf of Mexico, the aircraft were busy bringing in emergency supplies and evacuating personnel from potential flood areas.

The hurricane hit Brownsville, Texas, on Wednesday, 20 September. Harlingen experienced 125 mile per hour winds. By Thursday the winds had begun to subside and by Friday the helicopters were again flying in the area.

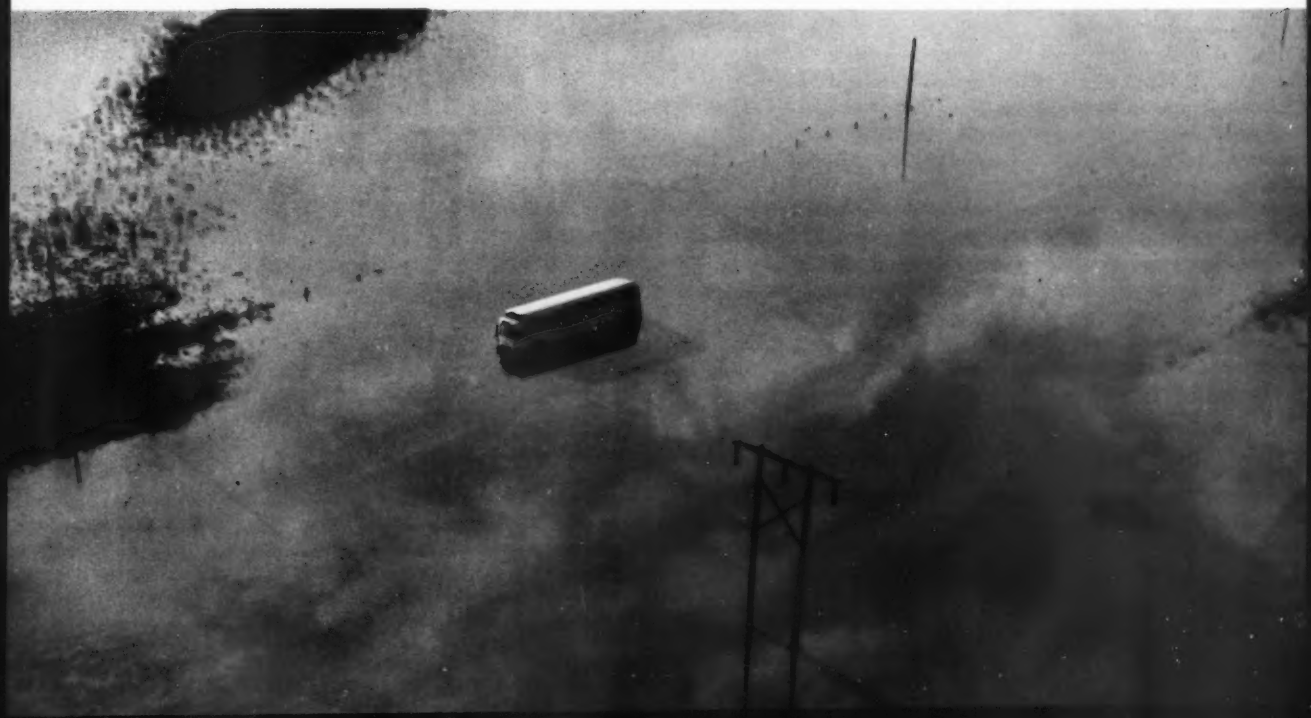
Among the missions flown Thursday were 900 pounds of food to Sinton and 4,000 pounds of food to Brownsville. Electric light and power personnel were flown in to repair downed powerlines and restore power to hospitals and other areas where it was critically needed. Two towns north of Corpus Christi needed help and received prompt aid. Three Rivers, a small town of 2,000, asked for and received a doctor and snakebite kits. Refugio, a town of 5,000, asked that a generator be flown in to furnish emergency power.

In the meantime, more Chinook helicopters were on the way to the flooded area to furnish the bulk cargo carrying capacity needed. Fort Rucker sent four CH-47s with crews totaling 17. Fort Sill dispatched four and Fort Benning sent four. Altogether, fifteen CH-47Bs and one CH-47A reached the area before the operation was terminated.

As the winds began to die down, the rains started. Low areas that were fairly safe from the high winds were now in danger of flooding. People retreated to high ground and the top floors of buildings. Considerable effort was spent in rescuing victims from stranded automobiles, hilltops, and other places where they had taken refuge.

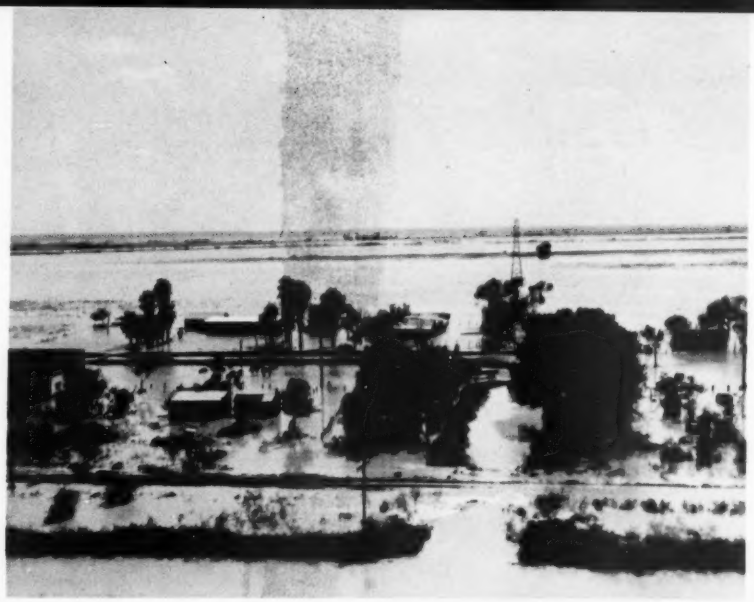
The helicopters came to the aid of water-isolated towns by carrying in food and other supplies. Desperately needed fresh milk went to Bayside, Texas, and bread to Beeville, Texas. Two doctors, four nurses, and six Red Cross workers were flown to Harlingen.

At right Hurricane Beulah as she appeared from 12 miles above her eye last year is poised to strike a devastating blow at Texas and Mexico. Beulah's fury resulted in flood waters that brought overland traffic to a standstill (below)



One Chinook came upon a stranded Mexican freight train carrying over 500 refugees, and it evacuated all of them. The pilot reported that "On one load we carried 67 people, not counting dogs, chickens, and children under 12 years."

By Sunday the hurricane winds were completely gone, but now heavy rain caused serious flooding along the Rio Grande, Atascosa, Nueces, and Guadalupe. These rivers and their tributaries caused widespread destruction of farmlands and homes. Entire villages were inundated.



Heavy rains following Beulah spilled the Rio Grande across the countryside (above). This resulted in the assembly of many armed forces' units including Army aviators (left) who soon were flying mercy missions both in the U. S. and Mexico (below)

Normal routes of traffic — roads and railroads — were washed away. Roads that were open Saturday were now flooded. Sometimes helicopters had to go in and rescue rescue teams.

The dam at Mercedes, Texas, broke under the strain, releasing a wall of water on Harlingen. The raging, muddy flood waters quickly surrounded homes and buildings that had, up to this time been a safe haven.

Along with the Task Force Headquarters, the aircraft at Corpus Christi moved to the Harlingen Industrial Airport. To get there, the aircraft generally followed U. S. Highway 77. Crews reported that the earth looked like an overloaded sponge. Houses looked like a series of houseboats on a large

lake, or woodpiles sticking out of a field covered with dirty snow. Every mile or two the highway was flooded. In the stretches of high ground between, vehicles of all kinds were stopped, stranding their riders. Even big high riding trucks and buses were not able to move.

The airport at Harlingen was comparatively high and dry but the town was mostly under water. The river had already passed its normal flood stage of 34 feet and the water was still rising.

Among the many emergency flights made Sunday was one to carry 65 cases of fresh milk to Falfurrias, Texas, for babies, children and sick persons. Some 60 missions had already been flown up to this time carrying food, medical supplies, doctors, nurses, and other personnel, and 400 stranded victims of the hurricane had been lifted to safety.

While "home base" for the heli-

Continued on page 32

Army aircraft — a CH-47 in the case above — evacuated many ahead of flood-waters engulfing the countryside. Rising waters also forced the evacuation of patients from the Harlingen Tuberculosis Hospital by Army CH-47 (below)

You'll be better off to wait until tomorrow!

Change of Flight Plan

He had heard others talk of the danger of trying to fly while looking both in and out of the cockpit when the weather was bad. Now he was convinced that he would never make that mistake again

Lieutenant Colonel John L. Jennings

THE RULES TO change a flight plan from VFR to IFR are really quite simple and are readily available to every Army aviator. They are listed on the back page of both the VFR and IFR supplements of the DOD Flight Information Publication. Knowing the rules, or having them readily available for use is one thing; being able to comply with them under adverse circumstances, however, can present a much more complicated problem.

For example, what good does it do to know how to report if you cannot communicate with anyone? Under certain circumstances communications, even when one has good radios, can be a problem.

To point out the difference between knowing how to refile and being reasonably able to do so, I will relate a story about the difficulties one aviator encountered while attempting to refile.

A captain had been flying a TO-1D for about 3 hours, barely maintaining VFR, when he landed at Shreveport for refueling. After making arrangements for servicing the aircraft, he stopped by the FAA flight service station to close his flight plan and make a quick check on the weather for Mineral Wells. He learned that every station between Shreveport and Abilene was carrying ceilings below 1,000 feet and less than 3 miles visibility.

The captain was hungry, a little tired from his recent flight, and not feeling too good in general. The latter condition probably was caused by the assistance he had given to a group of infantrymen in closing up the club bar the previous evening. All things considered then, his decision to eat lunch, recheck the weather, and then proceed on to his home station seemed quite logical.

Feeling a little better after eating, he went back to see the FAA weatherman and was dismayed to learn that things had not improved much during the last hour. He did find out, however, that another sequence was due in any time and things were due to pick up as the day wore on. The new sequence read something like this:

SHV	8	⊕	1 GFHK
GGG	5	⊕	½F
FTW	8	⊕	1 FH
DAL	7	⊕	½ FHK
MWL	10	⊕	2 GFH
ABI	15	⊘	15

Well anyway, it was clearing up out west due to a frontal passage, and if the front did not fizzle out, his chances of filing VFR to Mineral Wells (MWL) would increase during the afternoon.

The next hourly sequence indicated a slight improvement around MWL, but otherwise not much change had occurred along his proposed route of flight. Several cups of coffee and a haircut later, his check indicated a general improvement in the weather along the entire route of flight. Gregg County and the Dallas-Fort Worth area were carrying 1,000 and 3 and only Shreveport was below VFR minimums, with an 800 foot ceiling. About a half hour later this improved enough to hurriedly file out. The captain bid his new found "friends" at the FAA station goodbye amid such cautioning remarks as, "You'll be better off to wait until tomorrow. Shreveport has some nice motels."

The TO-1D engine sounded good on takeoff and the flight was enjoyable until the ceiling and visibility began to drop somewhere in the vicinity of the Kemp intersection. Kemp is located about midway between the Gregg County and Britton VOR stations and roughly 70 miles from either one.

At less than 1,000 feet AGL neither of the stations would lower the flag on his VOR instrument and he was unable to raise anyone on the en route communications frequency. He made a 180° turn and found that the weather had worsened back toward Gregg County, then turned to a southerly

course for a few minutes, only to make a like finding.

By this time, the captain had begun to wish he had checked into a motel in Shreveport as his FAA friends had advised. In fact, the more he saw of the weather the more he understood the wisdom of such a suggestion. He was really convinced of it when he barely missed a television tower that went on up out of sight in the clouds. Then the few terrifying seconds he spent wondering whether or not he would miss its guy wires seemed like an eternity.

Many thoughts crossed his mind . . . he seemed to remember something in the regs against filing IFR solo, but it now appeared to be the best thing to do. Anyway, how can a man file when he cannot communicate with a soul? Maybe a highway landing would be in order. So what if his buddies kidded him a little and his Ole Man asked embarrassing questions? But wait . . . there's the sun! A hole!

Hardly had the edge of the first ray of sunlight been penetrated when his arm pulled the stick back and he started a coordinated climbing turn to the left, keeping that beautiful sun in the corner of his eye

His problems were solved by providence. He had a wonderful feeling. Surely every cloud had a silver lining, or did it? He could not turn fast enough to keep the sun in sight, the hole was too small! The sun was gone! The plexiglass windshield and windows looked as if they were no longer transparent but had turned translucent.

To put it mildly, the captain was not complying with his VFR flight plan, and he did not have time to even consider refiling. He looked at the instrument panel and noted that the horizon bar on the flight indicator was vertical, the dot an inch to the right of it, and that the airspeed was nearing the red line. He did not even glance at the altimeter, but started correcting the first two errors. Things had just started to improve when he broke out at an altitude of approximately 400 feet. It was pouring down rain; the visibility was even worse than it had been a few minutes ago.

A few minutes ago! Could all that have happened so fast? Yes, my friends, and it was a wonder that this aviator still had a small chance to live, let alone refile.

He had heard others talk of the danger of trying to fly while looking both in and out of the cockpit when the weather was bad. Now he was convinced that he would never make that mistake again.

His gamble with fate had not yet been won; things were just delayed by cocked dice. He had better make his number on the next roll.

Things happen fast at 120 miles per hour under low ceilings and conditions of poor visibility. Even so, there was time for a better plan than chasing the sun. This time the captain turned to a westerly heading and started a deliberate climb into the soup. While climbing through 2,000 feet he began to think about how high he should go, what the minimum en route altitude was on the airway he had been flying, and how he was going to refile. A glance at his charts showed the MEA to be 3,000 feet. He leveled off at 3,300 feet, thus providing himself at least some chance of avoiding a collision with other aircraft.

Britton omni was now coming in strong. He centered the needle and found that he was about 15° off course to the south. A mere trifle. My, what a relief to have things going better! He tried several en route frequencies and finally contacted Greater Southwest International approach control. He refiled, flew toward his destination as the weather improved en route, and broke out in the clear around Weatherford.

If you should ever meet him, please do not talk about how easy it is to refile by reading the back of the IFR FLIP supplement or you may be in for a dissertation on how much more important role planning plays in making such a change.

V Corps Is Airmobile Trained

AFTER MONTHS of field training, aviators from the 18th Aviation Battalion have trained each maneuver battalion in the V Corps in airmobile tactics, making it the first in the U. S. Army to be fully airmobile trained.

Having started last fall with Company D, 17th Infantry, flyers from the 350th Aviation Company trained two company-sized units weekly (see "Airmobility in Europe," April 1968 DIGEST).

During the months of training, the aviators amassed 130,492,320 passenger miles without an accident.

After extensive classroom work and ground practice with static equipment, each of the companies was lifted into simulated air assault situations, usually three times during a day of training.

Ground training was conducted by a team of pilot-instructors, who used their Vietnam backgrounds in making the instruction interesting and useful.

Next on the schedule for the flyers and the maneuver companies in V Corps, according to the battalion commander, is an integration of airmobile tactics into the Army Training Tests.

NOTICE!

Tomorrow's commitment --

All flyable aircraft!

Major Earl E. Witcher

Adherence to the schedule established in the flying hour program would greatly facilitate the maintenance effort

TO THE UNIT maintenance officer the most familiar statement of the day in Vietnam is made by the operations officer at the regular nightly briefings: "Commitments for tomorrow — all flyable aircraft."

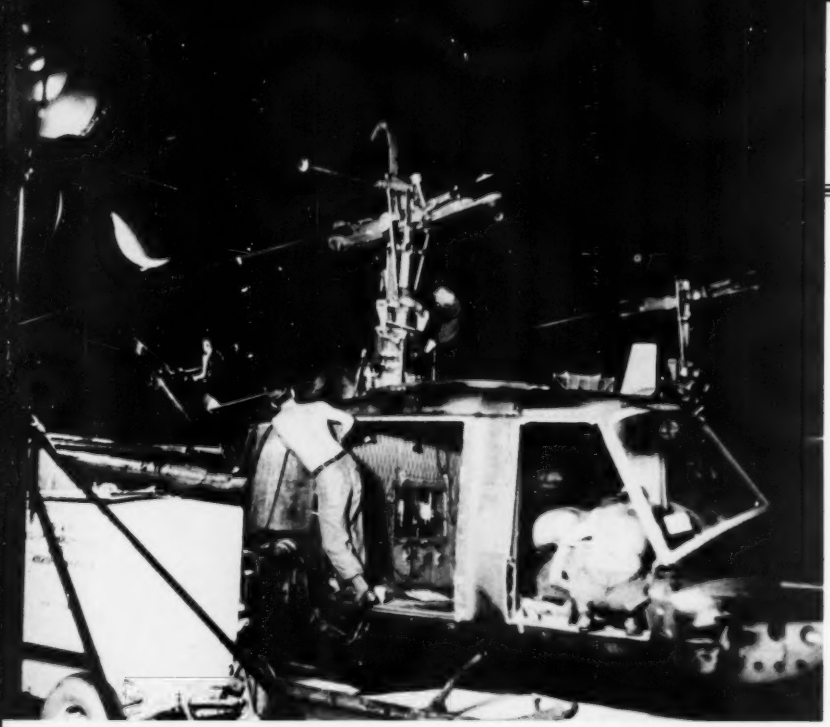
Those words never fail to emotionally disturb the maintenance officer, even though from the first day it was evident he could never satisfy the many requirements for aircraft on a sustained basis. He knew that again tonight his maintenance personnel would be performing "flashlight maintenance."

The principles of employing Army aircraft that ensure the ground commander freedom of use and immediate availability often are detrimental to the maintenance effort. Daylight hours are required for maintenance personnel to adequately perform necessary repairs and inspections on aircraft. Oftentimes these hours are not available simply because utilization of aircraft must be extended until after darkness.

Maintenance personnel must have adequate time to do their jobs, and this time must be made available during daylight hours. To consistently rely on "flashlight maintenance" while keeping all the birds flying every day will soon result in all aircraft being down at the same time. Close coordination between aviation commanders and ground commanders is required to prevent this situation.

The commitment of all flyable aircraft is more often the rule than the exception. The necessity to ensure the availability of all resources when major efforts are planned is unquestioned, but routine scheduling of all resources should be avoided. A commitment of not more than 60 percent of available aircraft on a routine basis would materially support the maintenance effort. It would provide the maintenance officer the opportunity to schedule his requirements in a more logical manner.

Using this percentage basis for commitment, the ground tactical commander can also benefit. He can depend on receiving a firm



Consistent routine scheduling of all of the flyable aircraft results in "flashlight maintenance" – a procedure that inevitably dilutes quality

number of aircraft on a regular schedule to satisfy his requirements, and he can obtain greater use of the aircraft through more detailed planning.

An improvement in the quality of work performed is evident when adequate time is available to maintenance personnel. A reduction also accrues in the probability of errors that could otherwise result in tragic accidents.

Additionally, adherence to the flying hour program as established by Department of the Army would greatly facilitate the maintenance effort and aid the operations officer in scheduling. DA has established that aircraft by types should not exceed a specified number of flying hours during each calendar month. This program was designed in part to provide for adequate maintenance time.

Experience indicates that this program has been exceeded on a continuing basis by some 20 to 40 percent. The requirements for aircraft to support a particular tactical situation cannot be specifically predetermined, and certainly preplanning of an operation should not be restricted because of a flying hour program. However, whenever practical, a significant reduction of hours in the "nice to have" category could be effected that would greatly benefit the aviation unit.

Maintenance performed on a scheduled basis at organization level is extremely important in aiding the scheduling at direct support level. When realistic projected dates can be furnished support units when specific aircraft will become available for required maintenance, parts can be requisitioned early and be on hand when the aircraft arrives. Work crews can be alerted and prepared to receive the aircraft.

Close coordination in this area between unit and support levels can reduce probable downtime by many hours in most instances. Daily contact, when possible, between unit and support maintenance officers tends to create and sustain a sense of urgency attitude among those personnel actually doing the work that is so vital in the overall effort. Too often aircraft remain in a "not-ready" status when with a little extra effort or ingenuity on the part of some maintenance officer or mechanic a mission-ready aircraft could be provided.

The sole reason for existence of all maintenance personnel at all levels is to support the using units with maximum resources possible. To effectively accomplish this task, a peak sense of urgency attitude must be sustained. Keeping the troops informed of the tactical situation, the accomplishments of supported units, and projected employment information consistent with security precautions will enhance the relationship among echelons of maintenance personnel and aid in developing and sustaining this sense of urgency attitude.

Command support at each echelon in the maintenance chain is paramount to the success or lack of success of the effort. Need for mutual understanding and appreciation of the problems facing each command has never been greater. The complexity of the maintenance and supply program is ever increasing, with introduction of new equipment and lack of immediately available resources to support existing equipment.

Add to the situation the problems inherent in the combat environment in Vietnam — rapid turnover of personnel, lack of qualification and experience of replacement personnel, delays in receiving repair parts, as well as adverse weather conditions and generally poor facilities — and it becomes readily more apparent why the need for solid command

support has never been greater. Equally increasing are the demands and requirements of the ground tactical commander. As more areas of the country are cleared, the greater distances involved require more use of Army aircraft.

A shortage of aviation repair parts in Vietnam has been fostered by the units themselves in many cases. Units deploy with an adequate supply of repair parts on hand to sustain operations under normal situations until resupply in-country can be expected. The first shortage occurs the first time one of the parts is used unless a requisition is submitted at that time to replace the part, thus creating a demand on the supply system.

Unfortunately, proper supply and demand procedures were not followed by some units at the beginning. As the supply of conex containers began to get low, requisitions were submitted in vast numbers. However, since demands for these had not been established the supply system could not tolerate this influx of requests. The shortages became real, and delays in delivery were the result.

Although there has been much improvement, the problem has not been eliminated. Errors on requisitions, unnecessary delays in submitting requisitions, unnecessary delays in processing, and weak follow-up action still contribute to the problem of shortage of repair parts and delays in delivery. Close coordination and cooperation between supply personnel in the using unit and direct support unit will help eliminate this very real problem.

Significantly, shortcomings in the procedures in one unit not only affect that unit itself but other units as well. Many times parts are diverted from one unit to another because of the urgency of demand, even though the urgency may have been created by an unnecessary delay in requisitioning by some unit far removed from the unit from which the diversion was effected.

A unit's performance depends largely on how well its maintenance personnel perform. Their performance depends largely on scheduling

As complex as the supply system is, it is still highly effective when the procedures are followed. Improvement can be made with continued close supervision and command support from the user level through all echelons in the system.

Although the aviation maintenance officer's role in Vietnam is one of the never-ending problems, it is also perhaps one of the most rewarding jobs in the unit from the standpoint of self-satisfaction. How well the maintenance officer does his job will, to a large degree, determine how effective the entire unit is. If aircraft are not available, the unit cannot perform its mission. The maintenance officer must provide those aircraft.

The scope of his responsibility is not limited to a supervisory role over those personnel actually doing the mechanical labor and related tasks. He must be an advisor to the commander, he must be a technical expert to the other assigned aviators in the unit, but above all he must be the leader of those performing for him.

When "flashlight maintenance" is required, he must hold the light. He must be immediately responsive to suspected maintenance difficulties when missions are in progress, and his judgment and decisions must be of such character that they are beyond question. He must retain the professional respect of all aviators who fly his aircraft. When the operations officer announces "Commitments for tomorrow — all flyable aircraft," he must have already thought of ways to produce one more mission-ready bird. There is no room for mediocrity in the role of an aviation unit maintenance officer in Vietnam.

NIGHT Tactical Approaches *and* Formation Flying

CW2 Barry R. Billman

THE ABILITY to perform night tactical approaches has direct bearing on completion of the mission. We are concerned with the type of approach that is made to field expedient lighting in unimproved areas. The U. S. Army Aviation School has recognized this need and has included intensive training in night tactical approaches. This type training, given in the tactics phase, should be made available to all aviators.

Night tactical approaches are inherently more difficult than a normal approach to a stagefield. But by following a few simple rules and with adequate personnel on the ground to establish the landing zones, these approaches can easily and safely be accomplished.

Field expedient lighting can range from nothing but vehicle lights to the more elaborate flare pot and lantern configurations. Of course, the only thing the aviator can do about the lighting is ensure that the people setting it up are responsible and accurate.

When using vehicle lights or any bright horizontal lighting, the landing zone should be established so the light source is located 45° off the approach axis and behind the intended touchdown point. In other words, the light is pointed away from the aircraft while it is on final. This keeps the aviator from being blinded by flying into the lights on short final. Several other types of setups are possible. Lights can be arranged in the inverted Y, T, and square patterns. Also combinations of these can be used. Flashlights, light guns, flares, and lanterns are other sources of illumination.

When other than vehicle type lights are used to illuminate the landing zones, the light configuration should indicate the direction of approach. If possible, as when using flashlights or flare pots, the lighting configuration should also indicate the intended touchdown point.

One advantage of flashlight illumination is that flashlights may be tilted to an angle between 8 and 12°. The beams will provide a visual glide slope and help the aviator maintain the proper approach angle.

Whenever combined light sources are used, they should be placed in line with the approach axis with proper spacing between them. This will eliminate confusion and make the landing zone more discernible. The aviator will be better prepared to maintain the proper approach heading while on final.

If a radio is present in the landing zone, the proper call including specific information will be of great help to the aviator. The approach heading, terrain conditions, field elevation, if known, and obstacles which are present are of value to the aviator. All this information will help him modify the approach to better suit the area.

When approaching the landing zone the aviator should make initial contact with the area. One of the most important phases of accomplishing a night tactical landing is identification of the landing zone by the aviator. Not only is it embarrassing to make an approach to some farmer burning rubbish in the field but it is also dangerous. The longer the pilot waits to abort this approach, the nearer he is coming to unlit

By following a few established procedures, night tactical approaches and formation flying can easily be accomplished

obstacles and danger.

A simple question by the aviator, "Do you have an aircraft in sight 2 miles south of your landing zone?", to the ground personnel will promptly and readily identify the landing area. Other methods such as turning the rotating beacon off can be used to identify the aircraft. After this the ground party can give him vectors to the area. Ground personnel can give the aviator invaluable aid in helping him reach their landing zone.

Once the area has been identified, the aviator should establish the aircraft on downwind at sufficient altitude to observe the landing zone and understand the lighting configuration. The aviator should not rush the pattern nor cut any leg short. On the other hand, the landing zone must be kept in sight at all time. During the approach if the lights in the landing zone appear to flicker, the aviator should climb to a higher altitude where he has clear sight of the area. Flickering lights usually indicate the aviator has descended too low and obstacles are blocking his direct view of the area. When this occurs on final, momentary leveling and stopping the descent will again bring the area into clear view.

For most night landings a normal approach will suffice. By using lights in the area, the aviator can determine the proper rate of closure and approach angle that should be maintained. Once on final the navigation lights should be turned to steady-bright. In this way the aviator will illuminate the ground immediately around the intended touchdown area, as he nears termination. This will provide a ground reference and allow for any adjustments that need to be made before touchdown. Termination can now be better controlled. Touchdown should be made with no forward movement and a minimum rate of descent.

Avoiding use of landing lights

Unfortunately, some aviators cringe at the thought of night formation landings

should never come before safety. If any time during approach the aviator is not quite sure of the approach, the landing light should be turned on, a better reference established, or the approach aborted. In hazy conditions, however, the light should not be used, since glare may obscure outside visibility.

Approaches should not be made to terminate on or near any fires which illuminate the landing zone. "Near" is considered as the area in which the aircraft rotor wash would affect the fires. Two main reasons for this are the possibility of the aircraft igniting from fuel leaks or overflow from the fuel cells, and the rotor wash extinguishing the fires on short final. The latter might cause the aviator to lose visual reference just before termination, a very dangerous situation indeed.

Ground personnel should be instructed to monitor the approach. If at any time they think the approach appears dangerous the aviator should be advised. Two times that those in the landing zone can help are as the approach angle appears to be carrying the aircraft below the obstacles and when the aircraft is not lined up on the proper approach axis.

In establishing the landing zone, attention should be given to wind velocity and direction as well as obstacle clearance. The approach axis is determined mainly by the long axis of the area, but wind conditions and extremely tall obstacles might cause it to vary. Also terrain conditions of the intended touchdown area might cause the axis to vary or a lateral shift of the axis to take place.

When departing the area at night the aviator should initiate a climb as soon as possible to avoid any unseen obstacles. Upon departing he should not allow his vision to focus on lights in the landing zone. This may cause vertigo once he has flown past the lights and, being surrounded by tall barriers, he is unable to re-establish a reference or horizon. If possible, visual reference should be maintained with the top of the barriers from the time takeoff is initiated until the barriers have been cleared. The landing light tilted at an upward angle can be of immense help in establishing this visual reference.

The next subject — night formations and night formation landings in tactical areas — might make some aviators cringe. With a few basic procedures, however, the aviator can become proficient and gain as much confidence in these maneuvers as in other types of flying.

First, the aircraft must be adequately prepared for night formation flight. All position lights, including formation lights and tail light, must be operational before takeoff. Windshields should be clean to help prevent fixation and vertigo.

During takeoff all aircraft in the formation should have their navigation lights on steady-bright. The last aircraft in the formation should be the only aircraft with the rotating beacon operating. This reduces the chances of vertigo. Once the formation has settled down and all aircraft are in position, the lights should be turned to steady-dim position.

While en route the aviator should not stare at any one light of the other aircraft in the formation. Instead, he should observe the aircraft as a whole and try to picture its outline by using the position lights as a guide. If the aviator finds himself staring at any one feature of the aircraft, he should have the copilot take over or he should change his position in formation slightly. In this way the aviator will avoid vertigo.

Background lighting, as when passing over a town, might hinder seeing the position lights on other aircraft in the formation. If this occurs all aircraft return their navigation lights to steady-bright until the source of background lighting is past. If at any time the formation becomes split, all navigation lights should be turned to steady-bright until all aircraft are reoriented in the formation.

During all night tactical approaches in formation, landing lights of at least one aircraft in the formation should be used. The lead aircraft's landing lights will probably best illuminate the landing zone. If any other aviator feels unsure about his approach he should use his landing light. Once the landing light of any aircraft in the formation is used, though, it should remain on until all aircraft are landed. The reason for this is that some other aviator might be using someone else's landing light. The premature switching off of this light might cause him to lose ground reference and have trouble completing the approach.

In summary, by following a few established procedures, night tactical approaches and night formations can easily be accomplished. The aviator must avail himself of the training required to develop this proficiency. Ground personnel should become extremely familiar with night helicopter operations, and the aviator should learn to use these people to the best advantage. Light discipline within the formation must be adhered to and the full attention of all involved is required to avoid vertigo.

How good is your night tactical proficiency?

An AVLABS' Report On

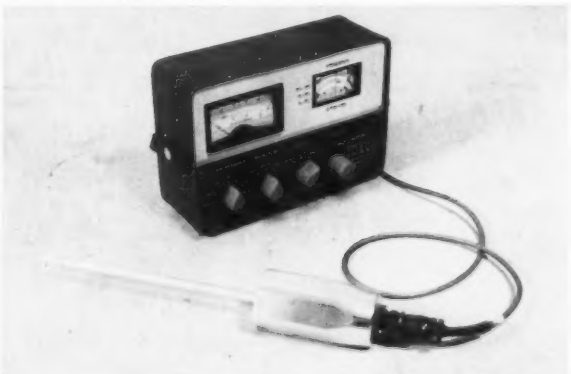
FAILURE DETECTION PROGRAMS

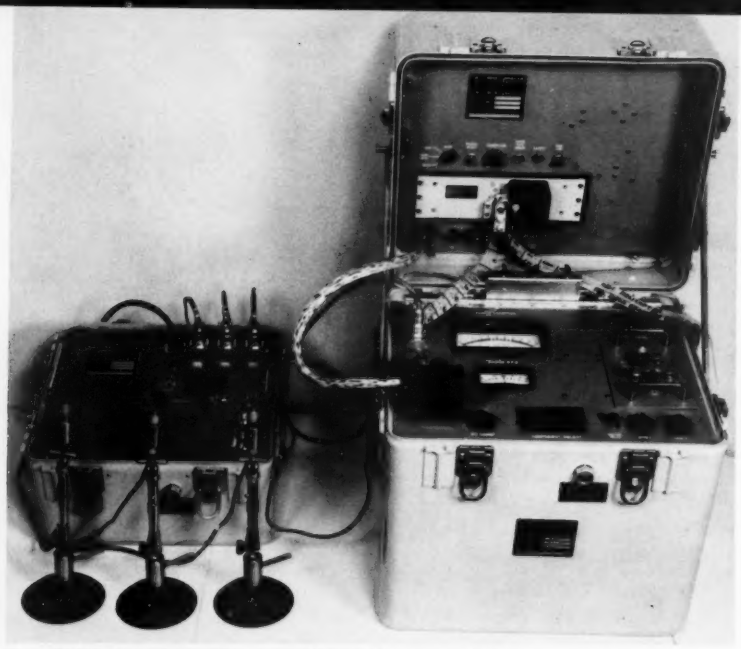
Leonard M. Bartone
Chief, Mechanical Systems Branch
U. S. Army Aviation Materiel Laboratories

THE DAY will probably never come when an aviator does not have to preflight his aircraft, but it now appears that the time may soon be here when part of his work, along with a lot of the work done by flight line personnel to check out aircraft or make routine inspections, may be partially automated. The U. S. Army Aviation Materiel Laboratories (AVLABS) at Fort Eustis, Va., is conducting a comprehensive program to develop monitoring systems to detect actual or impending failures of aircraft components.

Three types of systems are under study by AVLABS. The first is the outgrowth of a previous effort in which it was found that it is practical to determine the go no-go of a UH-1A helicopter with some sort of monitoring device. The system being developed is called the Automatic Light Aircraft Readiness Monitor (ALARM) and was originally built by the Bendix Corporation. It consists of sensing devices and continuity circuits that monitor various components on the aircraft. The sensors monitor temperature, pressure, and

A technician uses a portable vibration analyzer (below and right) which gives him an indication of the condition of internal components





The CWEA-4 sonic analyzer monitors the power train

vibration; the continuity circuits monitor the security of cowlings, doors, access hatches, etc.

It is planned to use this system two ways: as a go no-go system and to diagnose the trouble when the aircraft is in a no-go situation. In the go no-go system, the sensors will be coupled with a display panel which has preset voltage levels. For example, when the temperature of a part being monitored rises, the sensor connected to that part generates voltages higher than the level set in the panel, causing a no-go signal to show on the panel.

To pinpoint the trouble to some particular part, the sensors will be coupled to a device that will compare the voltage levels being received with previously recorded voltage levels of a similar helicopter known to be in good order. In this way, the component that is faulty or deteriorating can be found. A single sensor deviation will not designate the component which is malfunctioning, but the series of deviations of various sensors grouped together will form a pattern for diagnostic purposes.

The second type of system under study by AVLABS is a sonic analyzer, developed by the Curtiss-Wright Corp. It can tell in an instance any flaws or possible hazardous conditions existing in the power train and turbines of helicopters.

The analyzer, designated the CWEA-4, monitors the pattern of sound energy from the rotating components of the propulsion system to detect wear or other defects in bearings, gears, couplings and other power train components as well as turbine engine components. It consists of a number of high-efficiency microphones that are connected to an analyzer. The equipment can be handled by one man.

The analyzer operates on a fairly simple principle. All rotating machinery gives off noise at a certain frequency, depending upon such factors as rotating speed, number of gear teeth in mesh, number of balls or rollers in the bearings, number of blades on the turbine wheel, etc. Since the mechanical design of the propulsion system is known, the frequency given off by each component and part can be calculated.

At this predetermined frequency, the amplitude and pattern of the noise given off by the moving part can be compared with the amplitude and pattern of a component known to be in good condition. If the sound deviates significantly it is probably because the component being tested is faulty.

As an example of how the analyzer would work, we'll assume a mechanic wants to check the 42° gearbox on a UH-1B. All that would be necessary is to attach one of the microphones to the fuselage as near to the box as possible, set the dials to the proper position, run the turbine up to engine idle, and feed in a punched-paper computer tape for that model aircraft.

If there is a hazard — a worn bearing race for instance — the warning light will be on, and the aircraft can be grounded until the component can be removed and checked thoroughly. The same would hold true for any other component in the engine and power train.

Greatly simplified, the way the analyzer detects flaws is through electronic comparison of the actual signal received through the microphone with a second signal which is considered to be "normal" for that particular component. If the two signals are not within the designated limits, the warning circuitry is activated. A quick check as to what component is being tested at that moment lets the operator know which gear, bearing, or what-have-you needs to be further inspected. By using all microphones, the entire power train can be checked in one operation — from turbine to tailrotor.

The Army has purchased two of the experimental devices for testing. If they prove satisfactory, the present system of tearing down a component after it has run a certain number of hours may be changed to one where the component will be removed and replaced or repaired when its condition seems to warrant it.

This will constitute a great saving to the Army. The removal of

components for time run only is costly both in dollars and availability of equipment.

How much of a savings this could be is illustrated by a review of a hundred main transmission teardown reports conducted several years ago. Approximately 90 percent of those torn down had nothing wrong with them. Of course, the teardown system is still being used, because at present there is no other way to find the bad ones before they cause a nasty accident.

The propulsion system of helicopters contains hundreds of rotating components and it would not be feasible for mechanics at operation level to monitor all of these on a routine basis. If the equipment is adopted, they probably will monitor only those components that are critical or safety items. Routine inspection of the whole system would be conducted when the aircraft is in for periodic inspection. But when pilot "squawks" are reported, the operation personnel could "sweep" the complete system to determine if the trouble exists in that system.

At present the analyzer is only being tested on the UH-1, but a contract has been awarded to Curtiss-Wright for developing an experimental model sonic analyzer for the CH-47 helicopter propulsion and power train. This may be a little more difficult to handle than the UH-1 since it involves a tandem rotor power train.

The third type of monitoring system being investigated by AVLABS is designed to detect impending fatigue failure (It is not as advanced as the two systems above.) There are a number of ways it can be used, such as the measure of surface changes, electromagnetic properties measurements, measure of electron emission, measure of absorption or retention of an inert radioactive gas, etc.

Contracts have been awarded to several institutions to investigate the applicability of using these techniques to detect impending fatigue failures in aircraft structures and components:

• Bendix Research Laboratories are investigating the use of optical lasers to detect surface changes which would be caused by the dislocations which precede fatigue failure.

• Mechanical Technology, Inc., is investigating the use of an electrical inductive sensor to measure changes in the magnetic properties of the material resulting from fatigue distress.

• Cornell Aeronautical Laboratory is investigating the emission of electrons from submicroscopic cracks in the surface of materials.

• Industrial Neucleonics Corporation is investigating the feasibility of measuring the capability of materials to absorb or retain an inert gas as an indication of impending fatigue. The gas being used is radioactive Krypton 85.

If the three programs being conducted by AVLABS prove worthy, it will be a boon to Army aviation. Maintenance personnel will have a highly effective fault detection tool. Early detection of component distress and impending fatigue failure will reduce aircraft downtime. All in all, aircraft availability and safety will be greatly increased.

Body Armor Standardized

BODY ARMOR TO protect aircrewmen from small-arms fire has been type-classified "Standard A" after more than five years of research and development.

The form-fitting torso armor already is in widespread use by U.S. Army aircrews in Vietnam. It was first tested there in 1965. The U.S. Army Natick Laboratories had prime responsibility for its development.

Armor consists of a nylon cotton cloth carrier and rigid, anatomically shaped reinforced plastic armor plates. They protect against rifle and machinegun bullets. The armor can give protection against a .30 caliber armor-piercing projectile at a range of 100 yards.

The Flight Instructor-- A Professional

The demands on a flight instructor to serve as a teacher, a psychologist, and a psychiatrist are much greater than is generally realized

Major Bobby A. Ramsey

SINCE THAT memorable day of 8 November 1942, when three L-4s made a takeoff from the deck of the *USS Ranger* to support Army forces in North Africa, Army aviation has come a long way. It has grown from an aspiring group of artillery spotters to an organization capable of providing support never before dreamed possible. Army aviation continues to grow and expand. Even now there is a proposal to produce 800 new Army aviators each month to meet worldwide operational requirements.

To meet this requirement a tremendous increase in the Army aviation training program is necessary. After all the paper shuffling and desk jockeying have been completed to adjust to this requirement, the full responsibility to produce the end product will fall on the selected instructor pilots. Who are these instructor pilots, and what makes them capable of molding an aviator out of members of our "new generation" of soldiers?

These instructor pilots are not old-time aviators with thousands of flying hours and barrels of experience. Surprisingly enough, the majority of the instructor pilots at the Aviation School are aviators who graduated from flight school, served a tour of duty in Vietnam, and then returned to the Aviation School. The majority of these young returnees are doing a remarkable job as instructors. Immediately this disproves the theory that the aviator with the most flying time makes the best instructor.

This brings up the point — what makes a good instructor pilot? Certainly a flying tour in Vietnam doesn't make a good instructor. It may give him some valuable experience, but everyone must realize that flying operational missions in Vietnam is quite different from flying student training missions. Because the instructor successfully completes a Methods of Instruction course does not necessarily make him a good instructor pilot.

The foremost attribute a flight instructor should possess is professionalism. Although the word "professionalism" is widely used, it is seldom defined. In fact, no single definition can be provided which will encompass all qualifications and considerations which must be present before true professionalism can exist. Listed below are several major considerations and qualifications which must be included when discussing professionalism:

- Professionalism exists only when a service is performed for someone or for the common good.
- Professionalism is achieved only after extended training and preparation.
- True performance as a professional is based on study and research.

To be successful, the instructor must be able to gain the confidence of his students

• Professionalism requires the ability to reason logically, accurately, and to make sound decisions.

• Professionalism demands a code of ethics. The professional must be true to himself and to his students. Anything less than a sincere performance is quickly detected and immediately destroys his effectiveness.

Attempts to operate as a flight instructor without any one of these listed qualities can only result in poor performance and deficient students. Preparation and performance as an instructor pilot, with these qualities constantly in mind, will soon command recognition as a professional in his field of instruction.

The professional flight instructor must really believe in his work if he is to do his best. As long as he is instructing, he should strive to be the best flight instructor in his flight and his department, regardless of his plans after his current tour of duty.

In past years, qualification as a flight instructor was sometimes based only on the potential instructor's proficiency in the performance of practiced flight maneuvers. This has not always produced effective flight instructors. It is now generally recognized and accepted that instructor qualification must be based equally on teaching ability.

The professional flight instructor must be fully qualified as an aviator, without deficiencies or faults in his flying performance. In addition to this, the successful instructor must be a "school teacher," a "psychologist," sometimes a "psychiatrist," and at times a "mother." No disrespect is meant to these professions, but the desired point is made.

The flight instructor's first step in teaching is to gain the confidence of his students. This should be attempted even at the initial flight briefing. If he fails to gain and hold the confidence and respect of his students, all of the instruction he gives will be ineffective. Gaining the student's confidence and respect is very much a personal matter. At times difference in rank might seem a problem, but as long as a proper student/instructor relationship is maintained this will not present a problem. Consideration for the student's point of view and personal interest plus careful planning of each instructional period are essentials without which the student's confidence is quickly lost.

No two students are alike and the same methods of instruction cannot be equally effective for all students. The ability to correctly and quickly analyze a student, and then apply instruction in the manner to which he is most receptive, is a trait that cannot be effectively taught in a Methods of Instruction course. It only comes with diligence and professionalism on the part of the individual instructor.

An instructor who has not correctly analyzed his students may soon find that his instruction is not producing the desired results. This could mean that, for example, he has analyzed as a slow thinker a student who is actually a quick thinker but is hesitant to act. Such a student may fail to act at the proper time, even though he has correctly understood the situation and knows the correct procedures, be-

cause he lacks confidence in his own judgment or capability. The correction would obviously be instruction directed toward developing his self-confidence, rather than drill on flight fundamentals.

The slow student requires instructional methods which combine tact, keen perception, and delicate handling. If he receives too much help and encouragement, he may develop a feeling of incompetence. Too much criticism of his performance may completely subdue a timid person, whereas brisk instruction may force him to apply himself more diligently.

Gone are the days of the brow beating, profane, shouting flight instructors. This is the "new generation." The majority of aviation students are still in their teens or early twenties. In addition to making aviators, we are also molding officers for the Army.

A student whose slow progress is due to discouragement and a lack of confidence should be assigned intermediate objectives which can be attained more easily than the normal learning objectives. For this purpose, complex flight maneuvers can be separated into subparts and each subpart practiced until an acceptable performance is achieved. After subpart mastery then the whole maneuver should be attempted. As the student gains confidence and ability, his goals should be increased in difficulty until his progress is normal.

An apt or quick student can also present a problem. Because he makes few mistakes, he may soon assume that correction of errors is unimportant. Such overconfidence soon results in faulty performance. For such a student the professional flight instructor will constantly raise the standard of performance for each period of instruction, demanding greater effort from the student. Man learns when his errors are made known to him.

The professional flight instructor will keep his students aware of their progress. Failure of an instructor to communicate to the student his evaluation of the student's progress can establish a barrier that will block further effective instruction. This does not mean that the student should read and initial his grade slip on a daily basis, but the instructor should convey to the student his progress. This can be accomplished by directions, corrections, comments, and after flight critiques.

Almost everyone has his own image of flying. The flight instructor has a tremendous influence on his student's image of flying. The way the instructor conducts himself, develops and prepares his periods of instruction, and presents his instruction — all contribute to the formation of a positive or negative impression for the student. The success of a flight instructor depends on his ability to frame his instruction so that his students develop a positive image of flying, which is also important to a favorable learning situation.

All educators, and flight instructors are educators, have learned that negative self-concepts inhibit the perceptual process, that fear adversely affects the student's perception, that threats limit an individual's ability to perceive. Another lesson learned is that negative motivations are not as effective as positive motivations. A knowledge of these factors which have such a profound influence on the learner's ability to receive instruction is not enough. Professional instructors must keep a constant vigil to assure that these and other negativisms are not allowed to creep into their instruction.

The flight instructor is constantly on display before his students. Therefore his flying habits, during flight instruction and while conducting other operations, have a vital effect on safety. Each instructor is a paragon of flying to his students, who will, consciously or otherwise, imitate his flying habits. For this reason, a flight instructor must not only meticulously observe the safety practices he teaches his students but also he must maintain the appearance of constantly doing so.

A good example is the use of a checklist as required by AR 95-14. If a student sees his instructor start an aircraft and take off without reference to a printed checklist, no amount of instruction in the use of a checklist will ensure that the student will use one conscientiously when he is alone.

Habitual observance of regulations, of safety precautions, and of the precepts of courtesy will enhance and support the instructor's image of professionalism. Further and more important, they make him a more effective instructor by inculcating in his students the same habits of care and respect for the safety of other aviators.

The flight instructor must go beyond the requirement to develop technically proficient aviators who are knowledgeable in the areas of their equipment and flight maneuvers. He must not only teach the student to know his limitations and those of his equipment, but he must also teach him to respect and be guided by what he knows is right.

So you see the demands on a flight instructor to serve as a teacher, a psychologist, and a psychiatrist are must greater than is generally realized. Only by a keen analysis of his students, a continuing deep interest in them, constant self-appraisal and self-improvement, can he live up to his responsibilities and be a professional flight instructor.

Command and Control Helicopter

The hit and run tactics of the Viet Cong required the Allied forces to use quick reaction tactics. This prompted the development of an improved command and control helicopter

Major Paul V. Schreck, Jr.

REMEMBER the old days when you flew as combat support flight leader for an infantry battle group? With an OH-13E, control of the five subordinate units from the air was really a problem since it did not have an FM radio. To beat the problem, most of us strapped a PRC-10 on the litter so the battle group commander could communicate with his commanders and staff. Mickey Mouse as it was, it worked — most of the time.

The VC, with their hit and run tactics which requires the use of quick reaction forces, prompted the development of a better command and control (C&C) helicopter innovation. The commanders of reaction forces needed a helicopter command post where they, with a limited staff, could quickly proceed to an area under attack, make decisions and commit their forces.

Multiple radios could provide the capability for briefing the quick reaction forces en route to the objective, coordinating with other friendly elements in the area, and calling for additional support. To meet this requirement three AN/PRC-10 radios were lashed upright on the UH-1B cargo floor behind the copilot's seat. Three antennas were mounted on the starboard skid at 45° angles and were connected with standard antenna cable.

This configuration initially was used on several operations with some success, but it did have recognized disadvantages. It provided only FM communications, didn't have an intercom, and lacked a capability for all command personnel to operate and monitor all the radios.

A further development occurred in April 1963 at the U. S. Army Electronics Command's Avionics Laboratory, Fort Monmouth, N. J., (USAECOM). After studying the requirements based on information received from ACTIV (Army Concept Team in Vietnam), a system called the "Heliborne Command Post" was designed. This command post provided two FM radio sets (AN/ARC-44), one VHF AM radio (AN/ARC-73), and an HF-SSB unit (AN/ARC-102).

Four of these units were laboratory fabricated, tested and delivered to Vietnam in November 1963. Civilian engineers accompanied the equipment which was then installed and checked out on site.

The first unit designed left a great deal to be desired. It was bulky and reduced visibility as well as the number of passengers carried. USAECOM then sent a laboratory engineer to Vietnam to study the situation. Upon his return he not only developed the wiring and interconnection, but also mounting provisions, writing space, map display and a complete antenna system. It was designed to be installed in a few moments in any standard UH-1 aircraft.

This latest development, the AN/ASC-6, is a fine piece of equipment. Up to nine people can accompany the commander in a UH-1D and it provides him with two FM channels, a UHF or VHF channel, and a HF-SSB channel. There aren't too many of these in the States but they are plentiful in RVN. They are used on a daily basis in most outfits except the 1st Cav which uses a different type.

Since you are assured of at least one tour in Vietnam, it might be a good idea for you to be familiar with the equipment. I know you're already acquainted with the Huey, so let's concentrate on the communications central.

The airborne communications central (AN/ASC-6) is a box-like affair 32½" long, 17½"wide and 33½" high and weighs approximately 180 pounds. It fits between the jump seats in the Huey (an adapter plate is required for the D series), with fittings similar to those used to attach the jump seats.

The aircraft requires prewiring, but once the aircraft is wired it takes only a couple of men five minutes to install the communications central. It has two ARC-44 radio controls on the upper rear, readily available to the commander or others sitting in the cargo compartment. A UHF (ARC-51BX) or VHF (ARC-73) control, depending on the needs of the unit, is located on the upper right-hand corner of the top. The HF-SSB (ARC-102) control head is installed on the upper left-hand corner. All of these radios, with the exception of the ARC-102, are in addition to the aircraft radios. The ARC-102 control head permits control of the aircraft HF-SSB radio from the console.

Control of the radios is accomplished from six operator positions using the C-1611 intercommunications control (TM 11-5831-201-12). Four are on the rear of the AN/ASC-6. They are numbered and color-coded (#1 gold, #2 red, #3 green, #4 violet). Each has a similarly color-coded connecting cord equipped with a press-to-talk switch into which appropriate headsets are plugged.

The pilot and copilot also have individual C-1611s (#5 blue, #6 copper) through which they can use the communications central. Since they must also use the aircraft radios they use a "y" adapter cable to enable them to use both the aircraft radios and the communications central. This cable has one female jack for the headset and two male jacks, one for the aircraft radio connecting cable and one for the connecting cable on the communications central. Normal procedures are followed to use the aircraft radios, but to transmit on the communications central radios, the pilot or copilot must use the push-to-talk switch on the communications central connecting cable.

COMMUNICATIONS CENTRAL AN/ASC-6

Starting Procedures

1. See that antennas are in operation position and unobstructed.
2. Ensure that the central and/or adapter plate is securely fastened to the cargo compartment floor fittings.
3. Ensure that antennas and power connections are secure.
4. Wind and set the communications central clock.
5. Install headsets (H-101/U) to stations one through four.
6. Connect the short male plug of the "y" adapter cables to stations five and six. The long male connector (W-93) is plugged into the aircraft radio connector cables. Pilot's and copilot's headsets are plugged into the female connector (U-92).
7. Ensure all circuit breakers are out.
8. Turn power switch on. Power indicator should illuminate.
9. Depress the INT circuit breaker. Panel light on C-1611s should illuminate.
10. Depress all circuit breakers; set and check all radios for proper operation.

Stopping Procedures

1. Set all C-1611 receivers switches off (down).
2. Turn off all radio set control panel switches.
3. Pull out all circuit breakers.
4. Turn power switch off (down).
5. Disconnect all headsets and "y" connector cables and store in storage compartments.

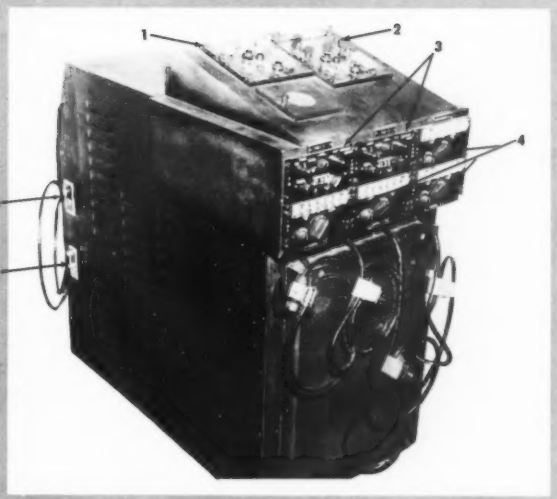
FIGURE 1

Preflight is pretty easy (see figure 1) but remember that these are aircraft radios and components. Ground commanders or their staff may not be familiar with their operation. It is your responsibility to assure that they are. Take special care to ensure they know

FIGURE 2

	Support of RVN Units	Support of U. S. Units
FM #1	Vietnamese FM Command Net	Command Net
FM #2	Senior Advisor Command Net	Fire Direction Net
UHF or VHF	Air Force Request Net or TAC Air Direction Net	Air Force Request Net or TAC Air Direction Net
HF-SSB	Aviation Battalion Command/ Operations Net	Aviation Battalion Command/Operations Net

Front view of communications central AN/ASC-10, illustrating pilot and copilot intercommunications control sets (1), main power switch and light (2), circuit breakers (3), AN/ARC-102 control coupling (4), and antenna connectors (5)



Left rear view of communications central AN/ASC-10, illustrating location of AN/ARC-102 HF radio (1), AN/ARC-51BX UHF radio (2), two AN/ARC-54 FM radios (3), four operator intercommunications control sets C-1611 (4), AN/ARC-102 audio connectors (5), and aircraft power connector (6)

how to use the C-1611. The switches for FM are #1 and #2; #3 is used for UHF or VHF; and #4 for HF-SSB.

The nets vary somewhat depending on the needs of the unit and desires of the commander. Most of the time, though, it will be something as shown in figure 2.

Control parties in support of ARVN operations normally consist of the following personnel: ARVN airmobile force commander, senior advisor, artillery liaison officer, air liaison officer, aviation element commander and aviation element operations officer.

For U. S. operation the party is the same except that an S-3 will probably take the place of the senior advisor.

The advantages that the command and control helicopter provides the commander are pretty obvious, but it does have some serious disadvantages. Among these are use limited by weather, vulnerability of key personnel, limited endurance of the aircraft, and limited space and facilities. Not much can be done about the weather and limited space, but some units decrease the importance of the others by having additional command and control helicopters and/or alternate control parties to provide for continuous operation and as an alternate in case one party is lost.

Techniques of employment vary with the desires of the commander but it is important to stay above 1,500 feet but below 2,500 feet absolute. This will keep you out of the way of other aircraft and out of effective small arms range. It also gives you a pretty good view of the overall situation. If you are going to observe an LZ or other area, circle at about ¼ mile with the commander on the inside to give him the best view possible. The use of the command and control helicopter to direct fire, mark LZs, control air strikes, etc., is strongly discouraged. Direct these type missions to the forward observer, forward air controller, etc. If you get tied up with individual missions it seriously reduces your effectiveness of overall control.

Like most other equipment this one is constantly being improved. There is already a new model out called the AN/ASC-10. This equipment utilizes two each AN/ARC-54 or AN/ARC-131 FM radio sets, plus either one AN/ARC-51 UHF or AN/ARC-73 VHF (depending on the mission) radio set. It also has voice security equipment. Descriptive information is covered in TM-5821-276-15 w/addendum, published August 1966.

I don't know just how far improvements on the command and control helicopter will go. I imagine some day it will be completely automatic. It will not only monitor the operation, but make decisions and relay orders and actions to subordinate units. That day we can really sit back and reminisce about "the old days."

Hurricanes Continued from page 13

copters was at Harlingen, a staging area for those operating in Mexico was established just south of the border at a small airfield at Reynosa, Mexico. From this field they ranged south beyond San Fernando, east to the Gulf of Mexico, and west to Camargo in Mexico and Rio Grande City in Texas (see "Hurricane Beulah," Jan 68 DIGEST).

Monday the flood waters continued to rise in the rivers. The Rio Grande now reached 43′ 10″ and at some points was 5 miles wide. In Harlingen the streets were flooded for four blocks on each side of the river.

A Chinook airlifted seven nurses and four hospital attendants to the Harlingen Tuberculosis Hospital. The hospital itself was not flooded but the area around it was, cutting off all ground approaches.

Highway 77 was still under water in many places. By this time JP-4 turbine fuel was beginning to run low. Four trucks loaded with 5,000 gallons of the fuel and some other supplies set out from Fort Hood to Harlingen, but the flooded highway made their journey slow.

At this time the main area of operation was below Rio Grande City and east towards McAllen as well as the area of Mexico just below the Rio Grande. By late Monday 150 helicopter sorties had been flown, delivering 52,000 pounds of food and medical supplies and evacuating 666 refugees.

To accomplish their rescue missions, the crews had to exercise all the knowledge they had acquired at school and all the experience they had gained in actual flight. Landings took place on railroad tracks awash with rising water, in narrow streets between houses and trees, in school yards, in cactus-studded fields, on irrigation dikes barely wide enough to accommodate the wheels or skids, in deep mud where the helicopter sunk to its belly. In some cases the pilot balanced the aircraft with two wheels on dry ground and two hanging over water.

In one mission, a Chinook made 28 separate landings and takeoffs. Another made 34 landings, delivered over 6 tons of food, and airlifted over 80 people — all in 7½ hours time.

The aviators had to be careful about landing near houses that were flooded. They feared the weakened structures would be damaged. This was especially so on the Mexican side of the border. There the force created by the whirling blades might "scalp" the straw roofs from the houses.

This meant that many primary landing zones had to be sacrificed for less favorable ones. A choice of a secondary landing zone usually required some intricate maneuvering to miss trees, cactus, or stouter buildings.

On Tuesday the four trucks with the much needed turbine fuel arrived. It had taken them 22 hours to drive about 240 miles.

Rescue operations continued to be mainly lifting stranded victims from the high ground where they had camped into areas where they could be more easily cared for. Somtimes it was easier to fly in Army mess teams with their equipment to cook for the refugees right where they were. Doctors and medical supplies continued to be flown into isolated areas.

One crew reported that they had landed in a field near a small Mexican village school. The field was ankle-deep in mud and water. The doctor they had carried had completed his chores and they had unloaded 300 sacks of food and were preparing to take off.

Before they left, however, the

It usually was necessary for th
miles by helicopter (above in
waters. But in other situation
teams and field kitchens to th
Huey teams with ground vehi
At lower right, a mission is con
to the Harlingen Tuberculosis
flood waters has passed

he Army to move families many
a CH-47) to be safe from flood
s it was better to bring medical
e people. Below an Army UH-1
icles to set up a rescue camp.
mpleted as patients are returned
Hospital after the danger from

white-haired schoolmaster marched his 5, 6 and 7 year old students through the field to the helicopter and had them sing the Mexican National Anthem. All the while they were standing in ankle-deep mud and water.

The water in Harlingen continued to rise, so it was decided to evacuate the 250 patients from the tuberculosis hospital just in case. The patients would be moved to Napp General Hospital at Edinburg, Texas. One Chinook and seven 2½-ton trucks took on this job. All the patients were moved on Monday, but some of the doctors and nurses had to wait until Tuesday. Also on Tuesday, five patients from the Harlingen Nursing Home were airlifted to the Mercy Hospital in Brownsville.

By Wednesday the Arroyo Colorado River near Harlingen had risen to 44.45 feet. The main street of the town was under water. The south side of the city was the hardest hit with water, in many of the homes it was 18" deep.

Everyday a planeload of hospital workers from Santa Rosa Medical Center in San Antonio would arrive at the Harlingen airfield. These dedicated people spent their day off helping the flood victims. Army helicopters would fly them to Ringgold School at Rio Grande City where an emergency hospital had been set up.

One of the UH-1Ds from Hunter Army Airfield rescued two shrimpboat fishermen. They had been stranded on a jetty for two hours in choppy waters off Port Isabel, Texas, in 45 mph winds. The fisherman had sailed from Galveston and tried to reach the Coast Guard station at Port Isabel.

Their 68-foot boat had been smashed against the jetty after the rudder had jammed. The next thing the fisherman knew they were in the water.

The Huey flew over the men twice before they were spotted. The chopper hovered over the jetty, rolled with the waves, and scooped down to pick up the men using the skids. Rescue was further hampered by the water's spray on the helicopter's windshield which made it almost impossible to see.

Gradually the swollen rivers subsided and Task Force Bravo's helicopters busied themselves by taking many refugees back to what was left of their homes and airlifting utility repair parties into isolated areas.

Before it was all over, Army fixed and rotary wing aircraft had logged more than 847 flying hours, airlifted 4,508 passengers, and carried 242.1 tons of relief cargo.

If you have been in the vicinity of Tuy Hoa South recently you know that facilities there have changed considerably, and a recurrence of this episode in that area is unlikely. However, the author's point is well made. This is a typical case of running out of good weather, daylight, fuel, and ideas at about the same time. Whenever the mission requires a flight to be made late in the day, a current weather forecast for the route and destination can be of inestimable value. Of course this is not always available, but if you do your homework and grab every FM frequency and call-sign you can, your chances of relating your plight to someone on the ground will be much better. With frequencies and call-signs you can talk to almost anyone you fly over these days

Monsoon Nightmare Over Tuy Hoa

Captain Salvatore Casarona

I DON'T REMEMBER the exact day or even the month, but it was late fall in 1966 and the wet monsoon season was in full swing over the II Corps coastal region. Our CV-2B "dump trucks" had been flying priority support for the 101st Airborne Division most of the week, hauling ammo and C rations from Tuy Hoa South to Dong Tre. This was an important mission and we knew it.

Weather was no longer a factor if it was better than "zero/zero." Like most other Army aviators in Vietnam, we always managed to fly under, over, around, or through it to get the job done. We knew the risks involved, and more often than not our judgment in making decisions was taxed beyond reasonable limits.

It was dawn when LTC Joe Kominek (USAF), myself, and our two enlisted crewmembers began our takeoff roll down the luxurious PSP runway at Dong Ba Thin. Joe had just arrived in the unit under Project Red Leaf and this was his first mission. It was my job as a unit IP to get him Vietnam oriented and operational. With better than 10,000 hours of flying experience, Joe didn't require much tutoring. He was cool, composed, and thorough.

We circumnavigated weather along our flight path and arrived at Tuy Hoa about 45 minutes after takeoff. Two additional Caribou joined us a few minutes later and we began our shuttles into Dong Tre. The mission was well coordinated through repetition and experience, and our support progressed smoothly throughout the day, with the exception of a few short delays due to the weather. As darkness approached and each ship had flown about 16 sorties, it was time to call it a day and head for home.

The weather now began to deteriorate rapidly. It was about 30 minutes before total darkness when our 101st coordinator asked us to make one more sortie. We reluctantly agreed and loaded up. We would expedite offloading at Dong Tre and proceed directly to Dong Ba Thin. Our other two ships preceded us into Dong Tre. They offloaded and were breaking ground for home as we arrived. By the time we got our load off and were ready to go, we had to use our landing lights for takeoff.

Joe had done a fine job all day, but we were both tired and ready to go home. We swapped seats and he now became the copilot. We knew the weather was going to be bad so we decided to fly back via Tuy Hoa, then south along the coast where we would have plenty of maneuvering room over the China Sea. On climbing out of Dong Tre, we immediately encountered light to moderate rain with visibility less than a mile. Occasionally I could see a light on the ground directly beneath us. As Joe tried to tune in the Tuy Hoa beacon, I attempted to call Tuy Hoa radio for a weather report. No luck. They were off the air and we couldn't receive the beacon.

At this point we were climbing through 1,500 feet trying for 2,000 feet. As we passed 1,600 feet we went completely IFR into thick overcast. I leveled off and dropped back down to about 1,400 feet where I could still see a flicker of ground lights here and there. We should now be about 5 minutes from Tuy Hoa and the coast.

Now Joe was trying to tune the Nha Trang and Cam Ranh

beacons, as I attempted to contact Cam Ranh radar, Nha Trang radar, Coastal Center, Qui Nhon radio, and everyone else I could think of. No one answered. I tried all possible frequencies on FM, UHF, VHF, and HF, but no luck. We were just too low and too far from the Nha Trang area to establish contact or receive a beacon.

I prayed there were no other aircraft in the area. We would never see them if they were. Then I thought, "That's ridiculous. A guy would have to be nuts to be up here in this stuff." I made a blanket call to any aircraft in the area, but there was no answer.

Now I could see a dim pattern of lights just ahead. It was Tuy Hoa. I looked for runway lights, but there were none. What was the weather like to the south? We didn't know and couldn't find out. I was worried now but tried not to show it. I couldn't betray the confidence of my crew. I kept telling myself that we'd been in worse situations than this before.

With our weather radar out, we had no way to determine what we were approaching. I turned the corner at Tuy Hoa and started south as we continued to attempt radio contact. It was no use. We couldn't raise anyone. Then, less than 2 miles south of Tuy Hoa, we were IFR again and now we had turbulence. I started a slow descent and turned back. At 1,000 feet we were still in it.

Then we could see Tuy Hoa again. I circled the town as we again tried to establish radio contact. Still no luck! We tried again to penetrate by heading east over the sea, and again encountered the overcast with rain and turbulence. We flew north and west, but it was the same. The overcast was all around us and the only place we could maintain any visibility was right over Tuy Hoa. I now realized that we were in a bind! It was the kind of situation that everyone talks about but that never happens to you! Well now it was happening to me and I had run out of logical solutions.

Now I began to think about procedures that I knew would be risky and dangerous, and that could result in the kind of thing you read about in the newspaper. I thought of climbing southbound, hoping we might break out on top. What would we be climbing through? How high would the tops be?

I toyed with the possibility of flying low over the water, navigating by time and distance. Surely I knew the coast well enough! But what about the weather at Dong Ba Thin or Cam Ranh? What if it's clobbered in there? If only we could get a weather report. Then I thought of my position of responsibility and realized that I couldn't possibly take the chance.

Joe was remaining thoroughly calm. He too realized that we had a problem, but he didn't seem worried. I knew he didn't want to add to my hidden anxiety.

I had to make a decision soon because our fuel was getting low and I knew that the small area we were orbiting in over Tuy Hoa could clobber in any minute. I looked down again at the pattern of lights identifying the Tuy Hoa complex. The bridge spanning the river which divided Tuy Hoa from the military complex to the south was easily recognized by its lights, even though I couldn't see the river. I knew the runway heading and its approximate location just south of the river, but there wasn't a single light or reference in that area.

I made my decision at this time and told Joe about it. He concurred with my thinking and agreed that a landing attempt at Tuy Hoa was the best solution now. We had to find that runway! I alerted our crew and proceeded to set up a pattern from a left base for runway 21. We completed our landing check and in a few seconds the familiar "clunk" of the gear was heard as it locked down. Turning final at a point I was unsure of, our flight engineer confirmed gear down and locked and I throttled back to begin our descent.

The intensity of rain had increased and the ceiling was lowering. I called for landing lights, flaps 30°, and a final check. Joe complied. As we came across the beach at about 200 feet, I still couldn't see the runway. I continued to 50 feet and leveled off. We missed it. I couldn't even see it off to either side! I applied power and we went around. We made another pass, and another, and another. Still no runway and the ceiling was starting to fall out!

On our seventh approach I noticed lights from a vehicle moving on the complex. A feeling of relief came over me as I thought that someone down there had finally realized we were in trouble and trying to land. This time I orbited the field in a tight pattern at about 700 feet and watched the moving lights on the ground. Yes, there were two vehicles and they were lining up at both ends of the runway!

Now the ceiling was down to about 500 feet and I prayed that it would hold for just a minute. It did. We turned final, lined up on the vehicle lights, and were down in a few seconds! My crew responded with a hearty cheer as I breathed a sigh of relief. I looked at Joe and he was smiling, but he didn't say a word. He didn't have to!

I won't expound on the moral to this story, and it wasn't intended or expected to draw any "wows." I'm sure that you have at one time or other encountered a similar or worse situation. I do know there's an outside chance that delivery of that last load of cargo may have indirectly saved a life.

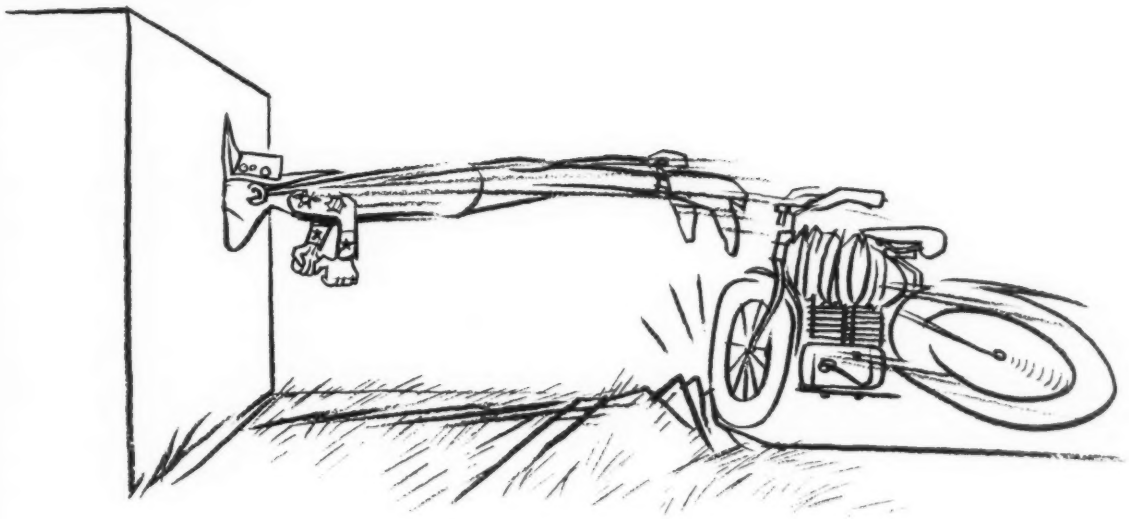
crash sense

the following 28 pages
prepared by the U. S. Army Board for
Aviation Accident Research

In the June and July issues, I gave you some examples of personal equipment NONSENSE. In this issue, Major Chester Goolrick, assistant professor of history at Virginia Military Institute and writer for Osborn, Foster, and Smith, teams up with famous cartoonist Bob Osborn to give you some vital points on personal equipment and what your attitude and thinking about personal equipment should be. For your sake, for the sake of your family, and for the tremendous investment the Army has in your training and equipment, I urge you to read and heed.

PEARL

Major Chester Goolrick

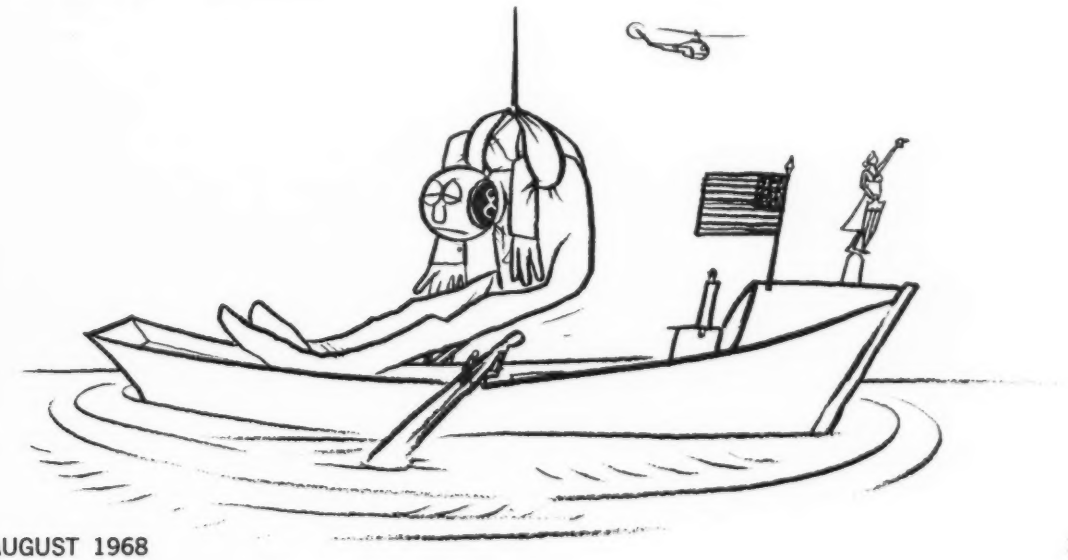


ONE SAD—and generally expensive—fact about this world is that some people insist on learning things the hard way.

Another sad fact is that in a good many cases the lesson is about the last they ever learn. Another example of that old business of too little, too late or, as old Eph Snodgrass, sage of Punkin's Corner, might point out, of locking the barn door after the rustlers have made off with the horses.

Every summer, newspapers are full of accounts of adventurous souls who have set out to row the Atlantic equipped with two chocolate bars and a pound of salami against the advice of every old salt from Hatteras to Gloucester. Very few ever wind up as guests of the Lord Mayor of London. They keep trying just the same. They have to learn the hard way. They do just that, somewhere east of Newfoundland.

Trying to make people like this see the light in advance may be a little like attempting to persuade a Bengal tiger to adopt a diet of cucumber sandwiches. They have heads with the specific gravity of pool balls to begin with, a built-in disposition not to listen to anybody or anything, and stubbornness



personal equipment sense

enough to make a Missouri mule seem as wishy-washy as Good Ol' Charley Brown.

Army aviation aircrewmen, praise be, are a different breed. Everybody in the Army wants to learn *everything* he can about his trade. He is aware that one way of soaking up the straight dope is by paying strict attention to the sage advice of the old hands who have been through the mill themselves.

The trouble is that, where aviation matters are concerned, there is straight dope lying around in freightcar lots, waiting to be soaked up. A man is always cramming new knowledge in on top of what he has already learned. It is sometimes possible to overlook, or forget, something he knows is important, or even critical. He needs to be reminded, the way your friendly painless dentist calls up to tell you it's time for your semiannual date with the drill.

So it is with personal equipment. Nobody in the Army is *against* personal equipment, any more than he would oppose motherhood and blueberry pie. But it is a sad truth, friends, that personal equipment is being misused, or not used at all, by a number of Army aircrewmen.

Why? They haven't given the subject the thought it amply deserves.

As a veteran crewman, you may know all there is to know about the need for personal equipment and its correct use. You may be even a little tired of the subject, the way you are of that movie you've seen eight times on the late, late show. But there is still somebody who badly needs to get the word.

Come to think of it, it might not hurt for you to do a little rethinking on the subject yourself.

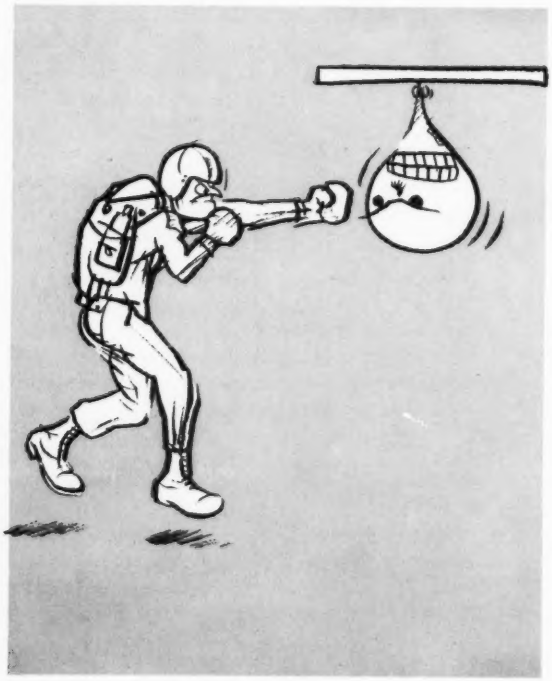
BASIC TRAINING

There are all kinds of personal equipment. Some of it we could do without and still live to a ripe old age. Robinson Crusoe got along on his desert island for about 20 years without a gold-plated toothpick, monogrammed tie-clasp, or patented ice-crusher to his name. In fact, he didn't know how well off he was.

The kind of personal equipment we are concerned with carries considerably more weight. *It is designed to enable a resourceful man to survive* — and, buster, if you don't think that "survive" is a very big word indeed, you try it on for size sometime.

It's a simple proposition. If you have the proper personal equipment, *and know how to use it*, your survival chances are raised from ground zero to something some of the fast money boys at Las Vegas

personal equipment sense



might be willing to risk a few bucks on. Don't you believe those stories about the men who've emerged from the wilderness after 40 days and nights with nothing to eat but a pair of old overshoes. There may be a few hardnosed characters so jungle-wise they can get by that way, but they will be the first to tell you it's no fun.

If survival is to be commended and everybody is interested in it, you would think the proper care and feeding of personal equipment would be as automatic a process as stoking up with enough calories and vitamins each day to ward off starvation, the yaws, and beriberi. The trouble is that when you run into somebody who doesn't know his survival equipment the way Unitas does his play book, you've also run into someone who has refused to come to grips with the unpleasant possibility facing all aircrewmen — that someday he may have to face a survival situation. He is not psychologically prepared any more than an ostrich with its head in the sand is for the lion sneaking up from the rear.

Anybody in this deplorable state can become careless about his personal equipment. What is worse, when the accident *does* come he is likely to be knocked off his emotional feet and robbed of his inborn will to live. Instead of fighting back with the

. . . personal equipment breaks down into two categories . . . the type to protect you when the accident occurs, and the type which helps you survive after it has happened.

resources at his command he may just sit there waiting for his guardian angel. More often than not the guardian angel doesn't show up until it is too late.

So every mature aviator who wants to see his grandchildren graduate from college will have a head start if he reaches the conclusion that the whole personal equipment bit can stand some good, sound, basic thinking.

And bear this in mind.

It's half the battle.

If you're behind by as much as three points at the end of the first half, chances are you won't be around for the second half kickoff.

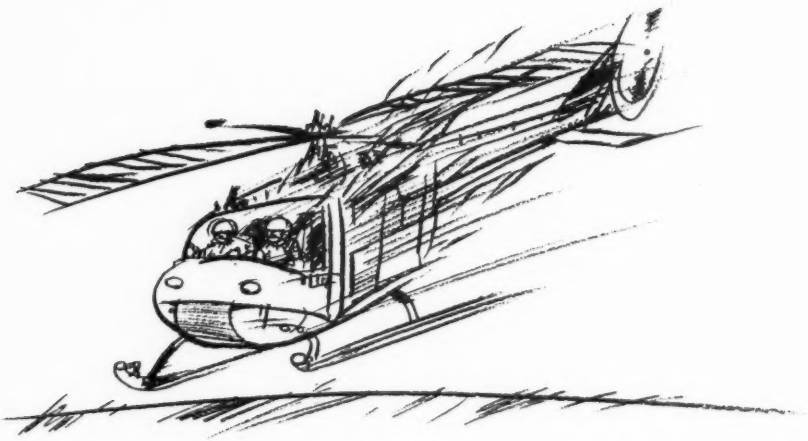
THINKMANSHIP

Sound thinking about personal equipment, like every other worthwhile undertaking, from pulling taffy to landing men on the moon, requires organization and time. It's easy for a loose thinker to devote 15 minutes to the subject and manage to give himself the impression it is so simple he'd be better off spending his time pondering more important subjects, like girls. A chap in this state might *also* eventually find himself down in a rice paddy wondering what all those interesting little doohickeys in his survival kit were supposed to be used for. What's more to the point, he might not even *have* a survival kit.

Basic thinkmanship about personal equipment revolves around three basic *personal* questions—and they are about as personal as any you'll ever ask yourself as an aircrewman.

1. What in tunket constitutes personal equipment, anyway?
2. What is it designed for?

personal equipment sense



All of us have listened to hairy accounts of crewmen who survived fires . . . thanks to protective clothing. The trouble is, you can't get through the day without hearing of someone who DIDN'T...

3. What's the best use for it?

The answers aren't so complex that they can't be readily absorbed by anyone with an IQ much higher than 20. But, like most deceptively simple answers, they can stand a lot of sober pondering.

Question number 1? In Army aviation, all the gear, including the clothes on your back, which somebody has insisted be aboard an aircraft in flight in any given situation.

Number 2? To give a man in an emergency a better-than-even chance of seeing his grandchildren graduate — in other words, to *survive.*

Number 3? Now you've asked yourself a fat one. The answer is arrived at only after a man has considered every item in his personal equipment from the standpoint of (a) what it is designed to be used for and (b) what it *could* be used for by somebody whose imagination teams up with his will to live to get him home in one piece.

Once you've pondered these three, you've graduated from basic and are ready to shift into a higher mental gear.

SECOND STAGE

Which is, of course, a full consideration of question number 1. The truth is, personal equipment in the survival sense covers a pretty wide range and a large assortment of items, some familiar and some odd — everything from the NOMEX to a package of chili powder. (*Chili* powder a survival item? You can bet your boots.)

Some of the confusion can be eliminated when you consider that personal equipment breaks down easily into two categories — the type which is designed to protect you *when* the accident occurs and the type which helps you to survive *after* it has happened.

Everybody ought to know enough about the first to make him appreciate its importance. Breathes there a soul so dead that he hasn't heard of the NOMEX suit, or other protective clothing, and what it can do? Or of the importance of having the sleeves rolled down and of wearing a helmet and gloves? The Girl Scouts, maybe, but not Army aircrewmen. All of us have listened to hairy accounts of crewmen who have survived fires hotter than the one they cooked up for Shadrach and his friends in the fiery furnace — thanks to protective suiting. And we all know of fortunate souls who are still walking around foot-loose and fancy free after absorbing wallops on their helmets which would have put King Kong out of commission.

The trouble is, you can't get through the day either without hearing of somebody not so fortunate who *didn't* have his sleeves rolled down or who took off his gloves or his helmet at the wrong time and in the wrong place. What's wrong here, anyway?

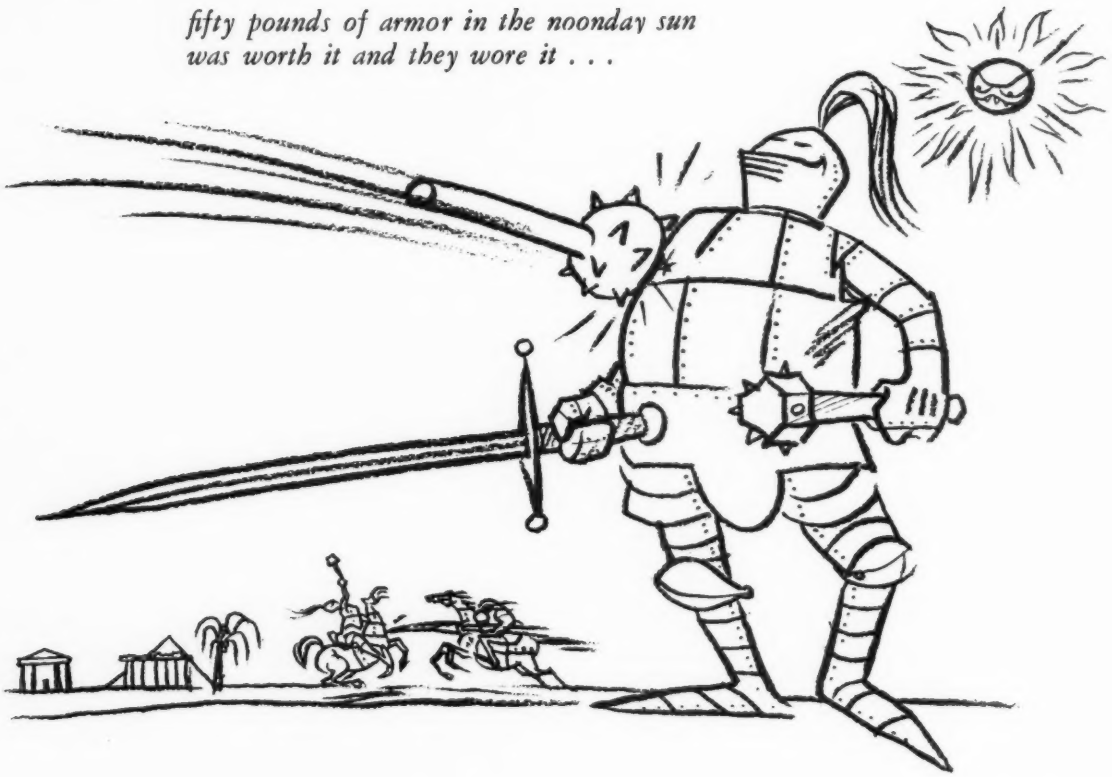
The same old story, the same tired old business of Galloping Take-It-for-Grantedness. As always, it is brought on by a man's failure to think things through. It has probably caused more trouble than anything in history from Oog the Caveman's time to the present. When Oog got a little careless about keeping an eye on the dinosaur he thought he had tamed, Oog got a nasty surprise and his widow and children went on welfare to keep from being evicted from the cave.

The central fact about personal items such as protective clothing, helmets, first aid kits, and the radio is that they are designed to get a crewman safely through an emergency *which can take place at any place and at any time in an aviation situation.* Life would be a beautiful dream, friends, if we could be certain that accidents occurred only on odd Thursdays before 1100 hours and were limited to the general vicinity of East Peoria. We could fly around wearing nothing but bathing shorts and panama hats without anybody ever getting hurt. If there is one thing an accident *doesn't* do it is to telegraph its punches in advance. The haymaker, in fact, is likely to come winging out of nowhere when you least expect it, carrying a wallop Jack Dempsey would have envied in his prime. When you are caught with your guard down, you're down for the count, make no mistake about it.

No self-respecting knight of old with a real desire

When you are caught with your guard down, you're down for the count . . .

fifty pounds of armor in the noonday sun was worth it and they wore it . . .



to stay whole ever went off on the Crusades without one of those double-breasted boilerplate suits of armor they used to wear into battle. True, they might have weighed 50 pounds or so and they heated up under the noonday sun, but Sir Galahad and his friends knew that when the going got rough they were worth all the trouble and discomfort — and then some.

There are plenty of people around today who have had this demonstrated to them through experience, though they wouldn't recommend it to others as a way of driving home the truth. It can be pretty painful.

Care to listen to the not-so-small voice of experience? It comes through loud and clear: "Anybody who flies around without gloves is just a plain idiot — and the same goes for boots. In the final analysis it is up to you — what you wear and how well you are prepared."

That, friends, is from a pilot, a high-ranking one, who was seriously burned in a flaming crash. He is alive today and walking around with two usable hands *only because* he was wearing gloves and boots. *He's been there—and he knows.*

Something to think about? Sure, even if it isn't very pleasant to dwell on. Nobody likes to consider the possibility of any kind of aircraft accident, but the idea of fire in the cockpit affects aircrews the way fire at sea does sailors. There are a few oldsters still around who get nightmares even today when they recall hairy episodes involving flaming crashes and gloveless pilots in the early days of flying. They don't like to talk about it and they don't like to think about it.

But here's the point. When you think about it, and cover it from all angles, the story can have a happy ending if your number ever comes up. Look at the case of one pilot who *had* given the matter due thought. He was trapped in a blazing cockpit for over

3 minutes, in temperatures hot enough to melt his chin strap and his shoulder harness, or about 2° higher than Old Nick keeps his thermostat set. When he finally broke loose he had minor burns on his neck and back because his back seat cushion was on fire. A miracle? Not unless you want to call a NOMEX suit a miracle — that and the fact he had his gloves and sleeves arranged in the way the latest styles call for. It is reported he now wears his NOMEX when he fries eggs for breakfast.

So the NOMEX isn't yet standard except in Vietnam? So who wants to be ranked as Just Plain Idiot, First Class, with Poison Ivy Palm? Adam and Eve didn't stand around complaining about the lack of department stores in the Garden of Eden; they used fig leaves as a field expedient. There are other kinds of protective clothing besides the NOMEX, perhaps not as effective but a sight better than nothing. A wise pilot uses every bit of gear that's available and lets the candidate for Plain Idiot of the Year Award sail blithely off, gloveless and in a short-sleeve shirt. Our prudent friend gets his burn on the beach, in easy stages, after slathering himself with a bucket or so of suntan oil.

Anybody who flies around without gloves is just a plain IDIOT . . . and the same goes for boots

SECOND HALF WHISTLE

All the personal equipment in the world isn't going to guarantee survival of a crash. It sure helps to have it around, as the fellow said after he had dived 15 stories out of a burning building into a fireman's net. The chap who had been dressed to the nines *for* an accident is a lot more likely to be around to take care of the situation after it has happened. He's also the type who will have made certain that he has on hand all the tools he can lay his hands on to help

him make it back to home base and a hot bath in one piece.

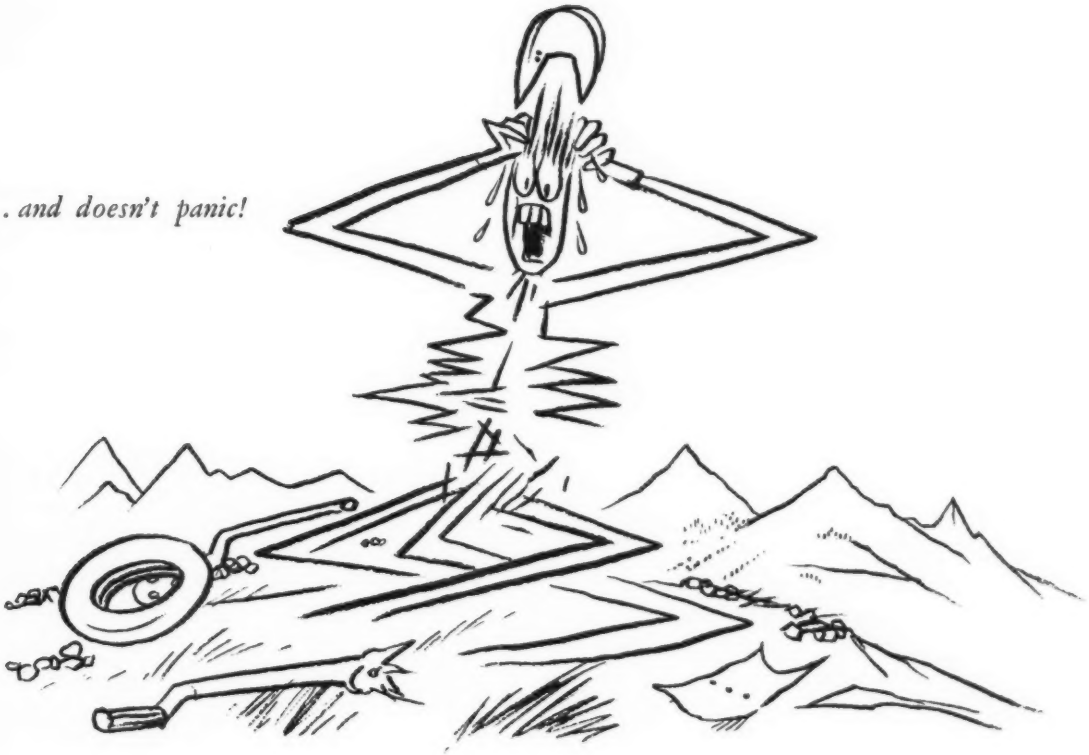
There are a couple of basic points to be noted about personal survival equipment. One is that nobody will ever be able to cram a cockpit with all the gear which could help get an aircrewman out of the mess an accident has landed him in. At one time or another, situations have arisen in which mousetraps, roller skates, and manuals on raising cocker spaniels would have come in handy. Nobody but Santa Claus can get one of everything aboard an aircraft.

The other point, on the other side of the ledger, is that it is amazing what a resourceful, thinking man can do with a bare minimum. Give a trained woodsman a knife, a bent pin, some string, and a few other assorted odds and ends and he'll come out of the wilderness after a week or so looking as if he had spent most of his time at Papa Joe's Pizza Palace. It's all in knowing how to use what you have — plus keeping a full set of mental marbles in a state of good repair. Unless the marbles keep operating at peak load, a downed aircrewman can find himself in the classic place of the unfortunate soul who found himself you-know-where without a paddle.

Unless he is *accident prepared,* even a relatively minor crash, one he gets out of without so much as a scratch or a bruise, can have the effect on an aircrewman that a hard right to the chin can on a prizefighter. Temporarily dazed. Reflexes as out-of-tune as a pawnshop guitar. His natural instinct to keep going — to *survive* — takes off AWOL. When he is knocked half silly in the ring, the really good prizefighter makes it through to the end of the round and the safety of his corner only if he is so finely trained that his instincts and ability take over in the clutch to see him through.

Just so with a survival situation. Any aircrewman who is honest enough to admit that accidents don't always happen to the other fellow and who has thought through to the possible consequences, has a built-in set of trained procedures that cover every conceivable situation from setting a fellow crewman's arm to the best way of preparing boa constrictor stew (this is the chap who knows what to do with that chili powder).

. . . and doesn't panic!



He may not have all the *answers,* such as what procedure to follow if he runs into Oog's dinosaur or is bombarded by shooting stars, but here is where his preaccident pondering will stand him in good stead. He won't just sit there.

Mental conditioning for the various messes anybody can find himself in after a crash starts with a hard look at what kind of postaccident survival aids are available, how they can be used, and how they can be supplemented. We've been asking ourselves questions. Let's try another. Like anybody else with a working set of mental marbles, you check the cockpit for the presence of your first aid kit as a normal part of your preflight. But now for the question — or two of them.

Do you know the *contents* of the kit? Do you *really* know how to use them?

Get the point? It would be a little tough when you broke open the kit to find that what vague notions you had regarding its use had been knocked out of your head by the jolt you got when your aircraft came down in a rice paddy, a Georgia pine, or

pre-accident mental conditioning and rehearsing

personal equipment sense

Different terrain, different climate, different needs. The accident-prepared pilot never forgets.

a snow-clad peak in Germany. In such dismal moments it is too late to (a) send down to the corner drug store for what you need or (b) take a cram course from the Red Cross.

Now if you want to ask yourself a third *question* — what would happen next? — go right ahead. You don't need to be supplied an answer.

And how about that little handy-dandy triumph of electronics, the RT-10 survival radio? It can be man's best friend in proper shape and used by a man who understands it. If it is back at base on the shelf, if its voice feature is out of whack, or you've never learned how the antenna is best positioned, you may someday find yourself in the position of the gent who gave up paying his phone bill and saved himself a lot of money — until the night his house caught fire.

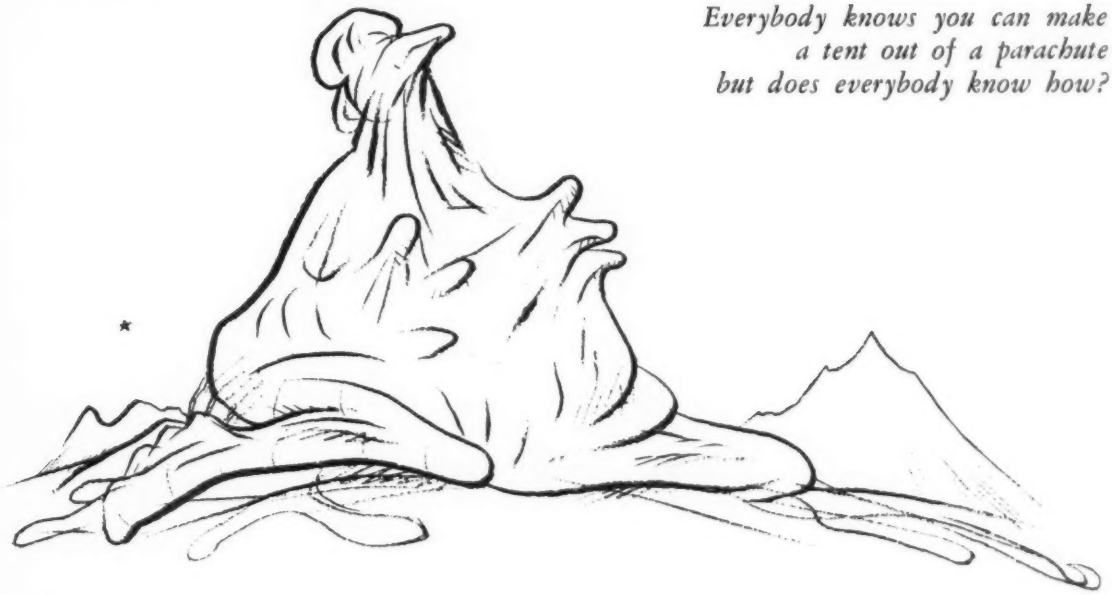
The first aid, the radio, and all the other personal gear, come to think of it, aren't a bit different from every other gadget man has dreamed up since the day Oog first hit on the idea of the wheel. Just having something around isn't going to be one bit of help if (a) the chap involved doesn't know how to use it, (b) it is put to the wrong use, or (c) a vital part is missing or broken.

Speaking of wrong use, every now and then somebody forgets that the flare gun is just what it says — a gun. We won't dwell on the details. On the other hand, there was the alert, accident-prepared pilot who found himself trapped upside down in the cockpit following a crash — and blanketed from air observation, at that. Our hero waited until he heard a helicopter overhead and fired his pen gun through a hole in the plexiglass canopy and above the trees. He's got a little time to wait yet until his grandchildren graduate from college, but he is still around.

A *little* wrong use can get in the way of a lot of *right* use at a crucial moment. Take, for instance, the case of another miniature marvel, the lightweight survival kit. A lot of high-powered thinking went into devising something which could help a downed aircrewman out of almost any scrape short of being swallowed by a whale. Those who have been through the mill will testify it works, that there is not an item which doesn't come in handy in one situation or another. Who would want to try to make boa constrictor stew without the chili powder to give it that added lift? Who would like to try a 20-mile hike through Florida Everglades without the mosquito head net and mittens? No one who has ever eaten boa constrictor stew or has been bitten by a Florida mosquito.

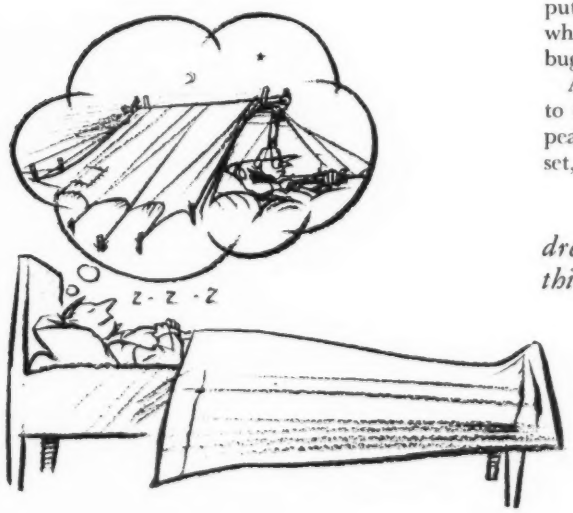
The chili powder and the head net aren't of much use to anybody if the kit has been broken into the way Bonnie and Clyde used to go through banks.

Everybody knows you can make
a tent out of a parachute
but does everybody know how?



Aircrewmen have been known to go into their kits and remove every one of the items from needle nose pliers to toothbrush — anything they happen to have a need for at the moment.

When they had a *real* need later they discovered it's a long walk back to the supply room.



WHO HELP THEMSELVES

The thoughtless chaps who break into their survival kits are helping themselves one way. So were Bonnie and Clyde and they wound up full of holes.

It follows that the sage who first remarked that fortune smiles on those who help themselves must have had something slightly less risky in mind. What he was talking about was good old red-blooded American resourcefulness, the kind of imagination which put Henry Ford in the automobile business at a time when everybody else was investing heavily in the buggy whip industry.

As we've remarked, no survival kit can be expected to touch *all* the bases. Most, but not all. It would be peachy to include a pre-fab house trailer, a television set, and a blonde starlet from a Hollywood studio,

dream about it!
think about it!

When you add it all up you arrive at one simple truth. . . it's your neck that's at stake.

but something has to give. Until they start making aircraft with interiors the size of department stores, including bargain basement, any type of survival kit must be (a) general in nature and (b) limited in size.

Here's another large area where resourcefulness and plain think-aheadness enter the picture. A thoughtful aircrewman facing a possible survival situation considers the standard equipment he has and then scrounges around to fill in the gaps. No sane aviator facing a flight across the Mojave Desert would work himself into a lather to get a vest guaranteed to keep him afloat until he could be picked up by a U.S. destroyer. He just *might,* however, give some thought to the water situation unless he has the built-in qualities of a camel. And while a man in Alaska needn't bother too much with some things he'd be sadly marble-deficient if he took off across polar bear country without a pair of mukluks or Mickey Mouse boots. So it goes. Different terrain, different climate, different needs. The accident-prepared pilot never forgets.

You can bet Henry Ford didn't just stroll down to the barn one day and start building his first tin lizzie. He gave a little thought to the subject first. When he began he had a pretty fair idea where he was going and how to get there. Think-aheadness can be just as profitable for a crashed aircrewman who wants to build himself a cozy three-man tent out of a parachute. Sure, everybody knows you can make a tent out of a parachute, but does everybody know *how?* Not as simple as it sounds, as some non-ahead thinkers have discovered. When most people try it without advanced knowledge they wind up draped with something that looks like an unfolded parachute. Whatever it looks like, it doesn't look like a tent.

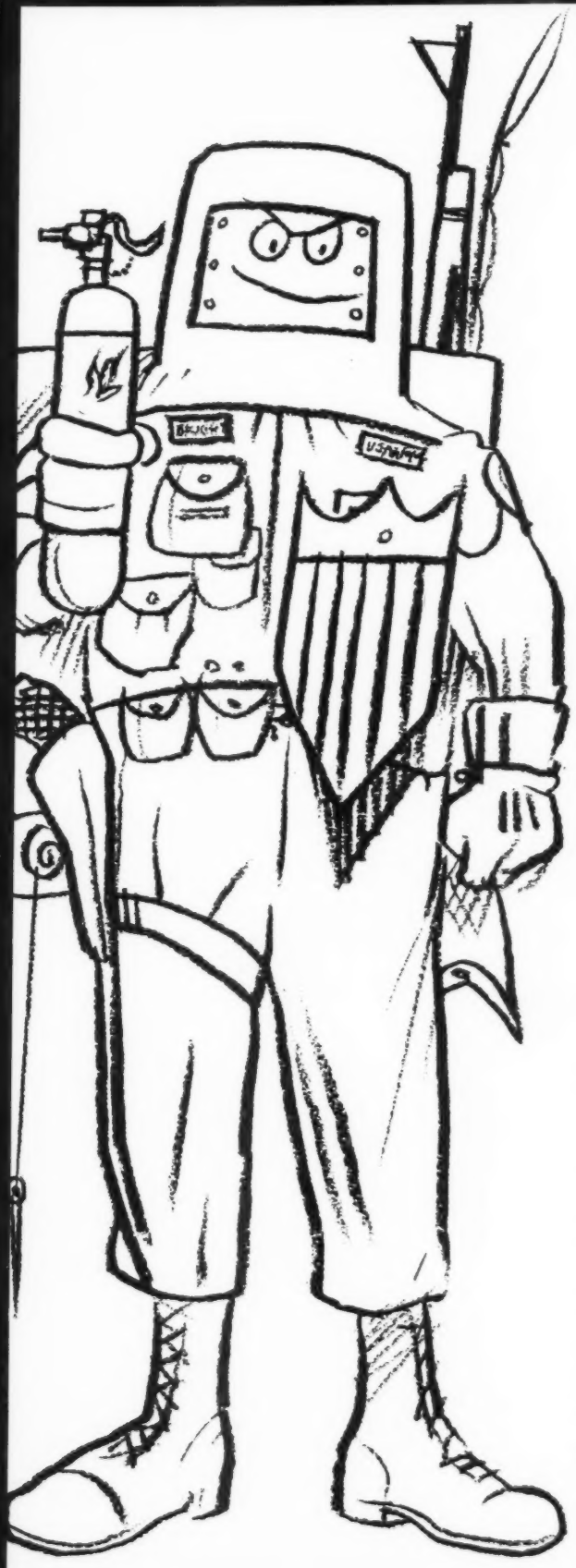
Yet it is no trouble to find out *in advance* how to make a parachute tent which would earn you a merit badge in any scout troop in the land.

Just keep thinking about the advance part.

IT'S YOUR NECK

When you start adding it all up you'll eventually arrive at one simple truth. It's your neck that's at stake, not somebody else's, and it is the only one you will ever be issued. We'll assume that you are interested in keeping it in good working order.

The way things are these days, every Army aircrewman's neck is subjected to more risks than insurance people would prefer. Flying aircraft in the best of circumstances isn't in the same category as raising daffodils or refereeing badminton games. When you throw in as an added attraction assorted characters who are out to see that you come to no good end, the situation becomes hairy indeed.



I'll use everything
I can get, wear
or load . . .

But there is no sense in piling on a few extra risks you've manufactured all by yourself. Neglect and improper use of personal equipment is as handy a risk-manufacturing device as you can find, short of pouring sand in the fuel tank.

Some risks can't be avoided. Some can. Where personal equipment is concerned it is a wonder anybody has to be reminded. After all, all that is needed is a liberal application of plain old-fashioned horse sense, the kind that kept Dan'l Boone and Kit Carson out of the clutches of the redskins.

Accidents do happen. Right? Personal equipment is available to help a man survive during and after a crash. Right again? So — the neck conscious aircrewman:

- Looks ahead — reads up on survival techniques and develops a sound preaccident plan.
- Mentally rehearses — very few schools burn down but students are marched in and out in fire drills until they develop fallen arches.
- Gets all the equipment he has coming to him, knows it, takes care of it, and uses it *constantly,* in the case of items like the helmet, gloves, and fire retardant clothing.
- Supplements what he has with whatever a special type of mission requires.
- Is mentally alert enough to hang on to his natural resourcefulness and his natural will to live when the emergency does arise.

As neck insurance, it's the equivalent of the kind of guarantee the Rolls Royce people attach to their cars.

But remember, friend, it is *your* neck and there is no -10 setting up an SOP for keeping it in one piece.

You are the only person who can take out a lifetime policy on it.

It's something to think about. If you haven't already got started, you are way overdue.

WHAT RULES?

Air Safety Rules, whether standing operating procedures, command directives, or Army regulations, are made to protect combat resources — namely you and your aircraft. These rules will accomplish their purpose ONLY when every aircrewman, regardless of rank, rating, or experience, accepts the fact that they apply to him as well as the other guy. The following two accidents illustrate what happens when they are not.

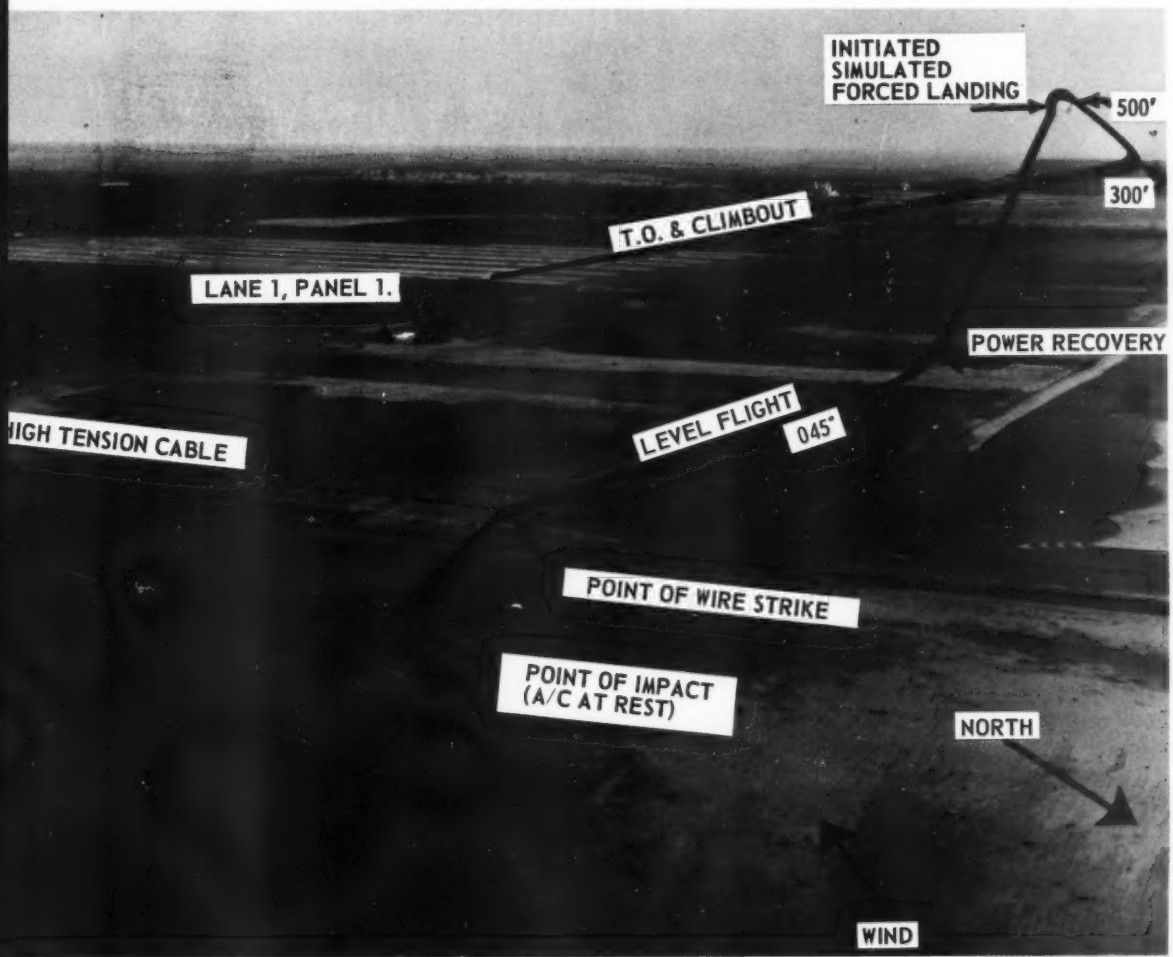
ACCIDENT NUMBER ONE

HELICOPTER STUDENT PILOT: ". . . After we did some hovering, we flew one or two patterns. We did a maximum takeoff and climbed to 1,400 feet on our crosswind leg. The instructor told me to break traffic. Just as I started to break traffic, he split the needles on me. I put the aircraft in a 50-knot attitude and the rotor was in the green. I was shooting for an open field. I believe it was around 100 feet or so when the instructor said 'I have it.' I said 'You have it, sir.'

"He told me to call and tell them that I had broken traffic for a simulated forced landing . . . . I made the call and, just as I finished, I looked up. All of a sudden I said, 'Wires!' I was pointing at them and I know he saw the wires, because he said, 'Oh God!'

"As we hit the wires, the aircraft seemed to continue on for a moment and I thought we had missed them. Then it seemed to slow as though we had just run into a large rubber band. I heard a loud popping sound. Then we started a violent nosedover and I could see the ground coming at us. I just closed my eyes and said a very quick prayer. I remember the impact and it seemed I opened my eyes as soon as we stopped moving . . . .

"I tried to turn off the battery and mags as I was



trying to climb out and undo my safety belt. As I climbed out, the cord on my helmet was still connected and I reached back and yanked it loose. I turned around and looked at the IP. I couldn't do anything for him other than try and get somebody, because I knew I couldn't get him out . . . .

"I noticed one aircraft fly within 200-300 meters of us. I took my jacket off and turned it inside out and tried to wave it at him, but he didn't see me. . . . I tried to flag another aircraft and it didn't come, so I decided to run over under the traffic pattern and try and flag one there. I realized if I couldn't flag one down there, it was just a short way to the stagefield. At this time, another aircraft flew over and the pilot saw me. Then he saw the crash and immediately landed.

"I ran back to the crash site. The pilot of the aircraft that landed was already out of his aircraft and there was another aircraft landing. I kept asking them to get the IP out. One of the pilots was trying to give him first aid and he asked if anybody had a knife. He couldn't get the harness undone, so I pulled out my survival knife and gave it to him. . . .

"About this time I saw a Huey coming. When it got there, I saw several people moving the aircraft to get the IP out. . . ."

Aircraft accident investigation board: ". . . The helicopter struck the upper of two ⅜-inch steel

cables, carrying 7,200 volts, suspended 29 feet 8 inches above the ground.

"Following the strike, the aircraft rolled over the wire, rotated about the tow link on the left skid, and tumbled approximately 150 feet through the air. The tail boom was severed in flight after the initial wire strike. The blue main rotor blade came through the left side of the cockpit and struck the instructor's helmet. The board felt that the blade came through the cockpit after initial ground contact and just prior to termination of the crash. The aircraft hit the ground on the left side and came to rest approximately 150 feet from the wire strike.

"The student's seat belt and shoulder harness retained him in position, half hanging, half lying on his left side. He turned off the magneto and battery switches and left through the broken bubble.

"The IP was between the left seat, firewall, and pedestal of the aircraft and the ground. The student saw no fire and was unable to assist the injured IP alone, so he attempted to run to the stagefield and get help.

"The downed aircraft was seen by other instructor pilots in the traffic pattern. They attempted to notify the stagefield tower, but the downed powerline prevented communications with the stagefield tower.

"The student pilot had been given precautionary shock treatment and a decision was made not to move the IP because of possible back or neck injuries. He was bleeding from the face and mouth. The medevac helicopter arrived with the flight surgeon and medical assistant and the IP was removed from the wreckage under the direction of the flight surgeon. Both the injured instructor and the student were evacuated to the hospital by helicopter. [The IP died 2 hours after arrival at the hospital. The student pilot sustained minor bruises to his left shoulder.]

". . . The flight commander was questioned and stated that to the best of his knowledge, the instructor had not previously been involved in violation of flight regulations. He further stated that 3 days before the accident he had briefed all instructors in his flight on flight safety and the importance of complying with regulations . . . ."

The board interviewed the student pilot:

Q: "Did you hear or feel the power come back in after the IP took control of the aircraft?"

A: "Yes sir. I felt him come in with the power and the aircraft stop its descent and start out."

Q: "About what altitude was this?"

A: "We had to be under 100 feet when we were climbing out."

Q: "What altitude did it seem like to you?"

A: "Fifty feet maybe."

Q: "Lower than usual?"

A: "No sir, not lower than usual. I know we were low. The first few times I'd always been scared of the autorotations, but then I had all the faith in the world in the IP."

Q: "At the time of impact, were you climbing straight?"

A: "I just remember seeing the wires and yelling about them. I'm sure we were climbing."

Q: "Was your ground track or your heading of the aircraft 90° to the powerline, or was there any turn made in the descent or in the power recovery?"

A: "I made a slight turn to the right."

Q: "From the time the IP took the aircraft, did he turn?"

A: "He was climbing straight into the wind. It looked to me like we were approaching those wires right at 90°."

Q: "Were your hands on the controls?"

A: "I had turned them loose. All I had was my finger on the mike. I didn't want to interfere with him. After we hit the wires I reached to pull the cyclic all the way back because we were in such a violent noseover, but it was already all the way back."

Q: "How high were you when the IP took the controls?"

A: "I'd say it was between 50 feet and 100 feet when he said 'I have it.' "

Q: "Did you continue your descent?"

A: "I think we did, but it couldn't have been very much."

Q: "About how low did you go?"

A: "I would say 35-40 feet was the lowest point."

Q: "Have you ever gone below 100 feet on simulated forced landings before?"

A: "We have, but sometimes he terminated just after I got it set up in a 50-knot attitude and rotor in the green. Sometimes we went almost to the ground. It depended on where we were."

Q: "At what altitude did the IP usually take over?"

A: "One hundred feet, or something like that. . . ."

The board narrative continued:

"The poles supporting the wires were not readily visible along the flight path due to the pole on the north side being behind trees and the pole on the south side having trees behind it.

"The board, upon consideration of the evidence, statements, and technical reports, established the following facts:

". . . The instructor made a power recovery from an authorized power-off maneuver below the prescribed altitude — 100 feet above terrain. He operated the aircraft below minimum altitude.

"The student had his attention inside the aircraft, while attempting radio communications . . . .

"The speed and altitude of the aircraft did not allow effective evasive action in the time available after the wires were seen by the student. The aircraft was flown level at 25-30 feet above ground level for a minimum distance of 675 feet prior to the wire strike. . . .

"Current regulations establish minimum absolute altitude for simulated forced landing training. The IP had previously operated below these established minimums. . . .

"The board finds that low level flight below authorized minimum altitude caused this accident and subsequent fatality. Contributing factors are considered to be a combination of high speed and inadequate observation, which did not allow time for effective evasive action.

"The board recommends that every effort be made, with command emphasis, to publicize the results and consequences of this unauthorized low level flight. Adequate regulations and directives exist, which, if followed, will prevent similar accidents."

Reviewing official: "Concur with the findings and recommendation of the accident investigation board."

USABAAR closeout letter: "USABAAR concurs with the findings and recommendation of the aircraft accident investigation board. . . . . Continuous effort must be made to eliminate from Army aviation those pilots who intentionally violate regulations. The board is commended for a thorough and complete report."

ACCIDENT NUMBER TWO

Aircraft accident investigation board: "The AH-1G left for a gunnery and transition training flight. After departing the firing range, the IP and pilot flew back to the marshland south of the airfield to practice low level autorotations and decelerations.

"While demonstrating either a low level power recovery autorotation or deceleration over the marshland, the tail rotor struck the water during a flare. The strike caused the tail rotor to fail. The aircraft completed one 360° nose low turn and the main rotor struck the ground/water to the left front of the aircraft. This strike caused disintegration of the blades, throwing the white blade 200 meters to the east, and pieces of the red blade to the north and east.

"When the main rotor blade struck, the aircraft turned 90° to the left and fell to the ground on a heading of north, burying the left skid 2 feet in the mud. It came to rest upright in 18 inches of water. Main rotor impact caused the transmission to break loose from its mounts, allowing it to tilt approximately 45°. The red main rotor blade struck the pilot's canopy, breaking out the plexiglass. The IP and pilot escaped with no injuries."

Question: "Beginning with the initiation of the maneuver, would you tell us the complete sequence of events as you recall them?"

IP: "We started at about 75 feet and 100 knots. There was a gradual slowdown until we reached about 55 knots. In the cockpit, from the rear seat, it looks less than that. You think you have the aircraft slowed down, but when you reach your spot you just keep on going. This was the student's problem. I told him you can flare to full flare if you want to. To hold it, you've got to pull pitch. I demonstrated it, and he said that he saw what I meant. By this time we were going about 40 knots."

Question: "At what point in this maneuver did you start adding power?"

IP: "Actually, I start rolling the throttle on way back in the maneuver. By the time I start the full flare, I have all the power in, but haven't started pulling much collective yet. As you start the nose

WHAT RULES?

The IP violated published directives for entry and recovery altitudes for a low level power recovery autorotation. The accident occurred outside the approved Cobra training area . . . the IP was aware of this . . .

down into a level attitude, you start in with the collective a bit. When you have it level, then you have the power in too."

Question: "When did you feel the stinger or rotor strike?"

IP: "Just as I started to level the aircraft from the full flare attitude. I felt a prang and it lifted the tail just a little. I continued to level the aircraft. We moved forward slowly, at about 20-30 knots, about 20 feet high. The pedals felt sort of loose, something like a high frequency vibration, only a little stronger. The nose started turning slowly to the right. I put in a little left pedal. The turning stopped momentarily, then suddenly it let go and the nose started to the right again."

Question: "What are you referring to when you say 'suddenly it let go'?"

IP: "I mean the tail rotor seemed to let go. The turn to the right stopped and then it started again. The tail rotor seemed to have no effect. It just stopped working. I no longer had control of the tail rotor. The turn to the right started again, but the aircraft was still sort of moving to the left. I chopped the throttle and attempted a hovering autorotation. It kept turning to the right."

Question: "How much of a turn do you think you made?"

IP: "I couldn't really tell just how far around we went. I don't know if we made a turn of 360° or not. I was going right, stopped, and ended up going left."

Question: "You ended up facing north?"

IP: "Yes. So I must have turned past north. When the main rotor hit we sort of got pulled back to the left and landed facing north."

Question: "Did you see the main rotor blade strike the water?"

IP: "No, I don't remember seeing it actually hit. I know that it did hit somewhere out to the left front of the aircraft. From where I was sitting, it would be almost to my left. The aircraft was tipping to the left a little. I had put a little left cyclic in because I wanted the blade to hit on the left side rather than on the right. I knew there would be less damage if the main rotor hit on the left side. The main rotor was turning real slow by this time. After we stopped, I watched the one blade start coming down. I knew

it would come close, so I pulled my head back. It hit the canopy in front of me."

Question: "At what altitude did your SOP indicate you should terminate autorotations?"

IP: "At 100 feet. At this altitude, I start adding power."

Question: "At what altitude did you start this particular maneuver?"

IP: "At about 75 feet — maybe 90 — but I think at about 75 feet."

Question: "At what altitude did you intend to terminate the recovery?"

IP: "A couple of feet above the ground, with power, and level at a couple of feet."

Question: "Why were you going so low when your SOP stated you were to terminate at 100 feet?"

IP: "This is a different aircraft from the Huey. In the Huey you have a lot of vertical parts of the aircraft against which you can judge how fast the ground is going by. In the Cobra you don't have this. A lot of times, when a student thinks he has it made, he actually is still going pretty fast — maybe 60 knots. At 100 feet, this is real bad. The student thinks he can make his spot, but he's just going too fast. To help him realize this, I sometimes take them on down to let them see that they couldn't make it. When they get to their spot, they just zip right on past it. They can see then that they just couldn't make it. They began to realize that this ship is different.

"When you think you are slowed down, you aren't. I think it is important that they understand this and I think the best way to teach them is to let them see it. I think that if they can make good approaches to a couple of feet above their spot, if the real thing ever happened, they could make it that last couple of feet to the ground safely. What I wanted to do was turn out safe students."

Question: "Was there a reason why you were demonstrating the low approach to this student?"

IP: "Yes. He had been either ballooning at the end of his approaches or else running by his spot. That's why I wanted him to get down low so he could see what he was doing — that he wasn't getting it slowed down as much as he thought he was."

The board interviewed the pilot:

Question: "In the previous time that you have been transitioning in the Cobra, have you anything special to comment about?"

WHAT RULES?

IP: "This is a different aircraft from the Huey. In the Huey you have a lot of vertical parts of the aircraft against which you can judge how fast the ground is going by. In the Cobra you don't have this. When you think you are slowed down, you aren't.

Pilot: "The IP had a tendency to let the aircraft go a long way before recovery from practice autorotations and forced landings."

Question: "Let the aircraft or pilot go?"

Pilot: "Let the aircraft go. He never let the pilot get beyond what he thought he could recover from. This is individual IP technique. I thought it was very good as far as demonstrations go, but we carried a few of them pretty close."

Question: "What do you mean by 'close'?"

Pilot: "Close to the maximum ability of the aircraft to recover. The IP would let you go almost all the way down to touchdown. In other words, the skids were almost touching, ready for a cushion. Then he would roll the throttle back in. I think this is very close. It pushes the limits of the aircraft and the IP's reaction. In this case I think we went just that much too far."

Question: "Were you on the controls at all during this maneuver, or were you strictly observing?"

Pilot: "I was observing until the time the tail rotor hit. Then when it came to a level attitude I came back on the controls, very lightly, to get an idea of which way he was going. When we started spinning to the right I knew immediately what had happened and I rolled the throttle off and was attempting to help him hold it level."

Question: "Did this instructor's habits differ from other instructor pilots you had in this course?"

Pilot: "Yes. He usually recovered much lower than others, down to 15 feet, while others recovered 50-200 feet above the ground."

Question: "How many different instructor pilots did you ride with in this training?"

Pilot: "Five, counting this one"

Analysis:

". . . This accident occurred outside the approved Cobra training area. The instructor pilot was aware of this and had initialed the reading file, indicating he had read and understood the boundaries of the training area. This subject had also been a topic for discussion in oral briefings conducted by the Cobra branch. The airspace has been apportioned to minimize the possibility of midair collisions. The instructor pilot's deviation is considered a breach of air discipline and a nonrelated cause factor in this accident.

"There was no signal or flotation equipment aboard the aircraft. The crew was on the ground approximately 35 minutes before they were able to contact another aircraft to report the accident. The accident had damaged the antennas, limiting the transmission range of the radio. There are numerous swamps, rivers, and marshes in the training area. In the event injuries are sustained by the crew from an accident in an inundated area, flotation and signal devices may be the only means of survival. . . .

"The instructor pilot erred in judgment during the demonstration of a low level power recovery autorotation by allowing the maneuver to progress to the point where, during recovery, the tail rotor struck the water.

"The instructor pilot violated published directives for entry and recovery altitudes for the maneuver performed. . . ."

UH-1D ACCIDENT REPORT narrative: "... The aircraft mission was to perform command and control and utility for an artillery unit. Throughout the day, the aircraft made numerous takeoffs and landings with various type loads at the location of the artillery unit. Due to wind conditions and numerous trees and bushes in the area, there was only one adequate takeoff lane available. The far end of this lane passed over two bunkers occupied by personnel of the supported unit.

"The aircraft was performing exceptionally well and the crew had no difficulty during the many takeoffs and landings. At about 1500, a refueling stop was made and the aircraft was flown back to the artillery unit area. A landing was made at approximately 1525 to make a final pickup of cargo and personnel.

"While the aircraft was being loaded, several of the supported unit personnel were seen erecting several bamboo poles in front of the bunkers at the end of the takeoff lane. These poles were 20-25 feet high. It was later discovered that the reason the poles were put up was to keep the aircraft from blowing dust and dirt around the personnel in the bunkers.

"At approximately 1600, the loading was completed and the aircraft prepared for takeoff. A power check was made and the aircraft commander (AC) and pilot saw that available power was satisfactory for the load. A ground run was started.

"As the aircraft neared the bamboo poles, translational lift had not been obtained. In an attempt to avoid striking the bamboo poles, the aircraft was turned to the left and a slight amount of collective applied. The aircraft began to settle and the AC decided to attempt to land rather than continue the flight over the edge of a hill. The aircraft landed hard in nose low attitude with a slight amount of forward speed. It landed on a heading of 15° from the original takeoff direction. The crosstubes buckled backwards and the skids separated. The crewchief sustained a sprained hip from the impact. All other personnel escaped injury. Immediately following the accident, personnel of the supported unit removed the bamboo poles and cut down other obstacles within the area.

"During removal of the aircraft from the tactical site, it was dropped in the sea when the lifting apparatus of the recovery aircraft malfunctioned.

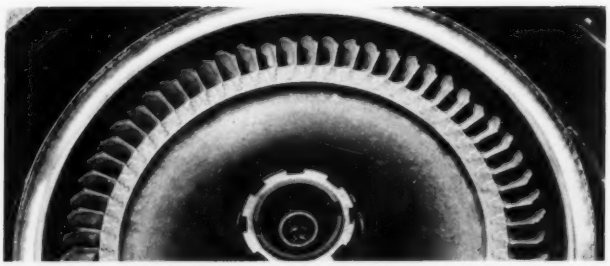
"Investigation revealed the following noteworthy facts: The crew had flown 8 hours on the day of the accident; the AC was extremely exhausted and had been so for a number of days (flying time for previous 30 days was 143.9 hours and for previous 24 hours was 16.9 hours); and the rpm warning system was inoperative and had been so through two periodic inspections."

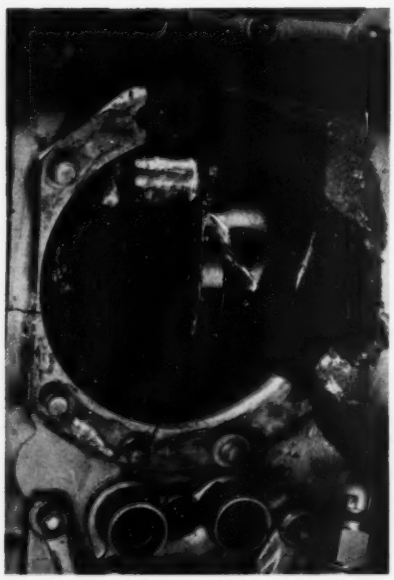
Aviation medical officer: "This accident had many contributing factors, one of which was the mental fatigue of the aircraft commander . . . He took off in the same direction that he had been going all day, even though he had seen the bamboo poles that had been erected in his path since his last flight. He realized too late that he couldn't clear them and veered to the left, lost rpm, and went down . . . I believe his errors in judgment were the result of fatigue. The fatigue was the result of too many working hours in one day . . . . "

2-3 MINUTES

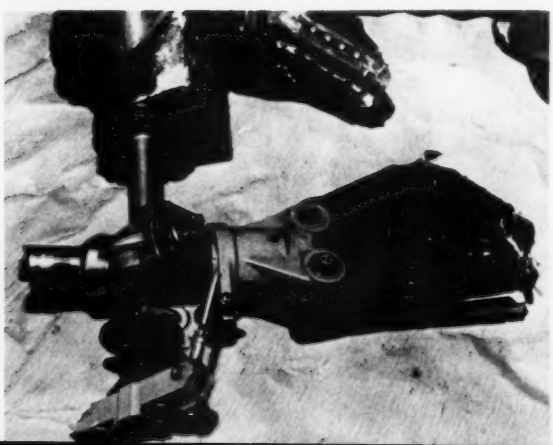
CH-47A PILOT: ". . . Our aft gear struck a dike and bounced the aft section of the aircraft into the air. We then settled onto the field which was planted with corn.

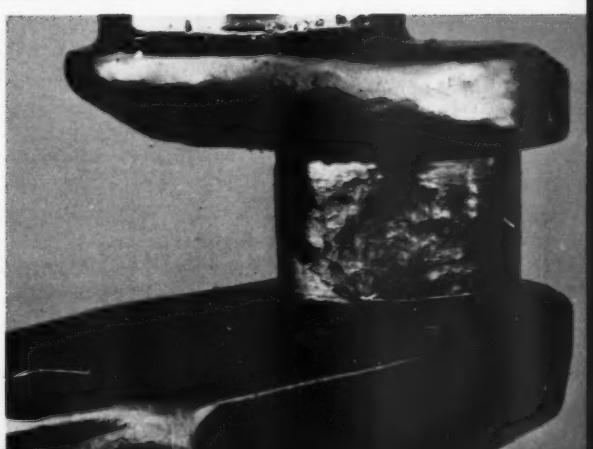
"We started the APU and attempted contact with the nearest operations with no success. We called on guard 243.0, but received no contact. I left the aircraft with the emergency radio and activated the distress beeper. About 2-3 minutes later, two F-100's flew over and I made contact with them. Soon, a UH-1D landed. Our crew and the crew of the UH-1D set up a defense perimeter until recovery personnel arrived."





WHY PARTS FAIL





Ted Kontos

Of 100 Army aviation mishaps during a recent week, 49 happened after parts failed. Only five of these might have resulted from inherent defects.

ATOMIC POWERED SHIPS and submarines cruise for months without refueling. Space vehicles venture further and further in probes of the universe. The equivalent of many pounds of electronic equipment have been compressed into small sections of thin wafers weighed in grams. Advances made in all technological fields during recent years stagger the imagination. Despite this modern know-how, we still have trouble molding a round tire, squaring a door frame, or assembling a new car without squeaks and rattles.

Product failures are most conspicuous right after Christmas when Johnny's wagon sits idle because a wheel has been lost; Jimmy's train won't budge because a gear is stripped; and Billy's air rifle sounds like a tire going flat because of a blown seal. The popup toaster won't pop; the vacuum cleaner won't clean; and most of us outlive our *lifetime* fountain pens.

Part failures cost millions of dollars each year, to say nothing of the inconvenience. Because most do not jeopardize safety, we take them in stride with a they-just-don't-make-them-like-they-used-to attitude. But failures involving Army aircraft cannot be treated so lightly. Not only do they cost great amounts of money, require large inventories of parts, and delay missions, they also threaten aircraft destruction and the safety of crews and passengers.

Of 100 Army aviation mishaps during a recent week, 49 happened after parts failed. The cost for these was approximately $400,000. Yet a check showed that only five of the 49 part failures might have resulted from inherent defects. Damages from these totaled less than $20,000 — a difference of $380,000.

What about the remaining 44 mishaps? In one instance, two bearings of an OV-1 engine failed. Laboratory analysis showed the failures were caused by deterioration of the bearings due to water contamination of the engine oil. In another instance, the left flap cable of a T-41 snapped, causing the flap to remain in the down position during recovery from a simulated forced landing. Inspection showed the left inboard track arm contacted the flap well stiffner, placing an excessive load on the retract cable, causing it to break.

UH-1 engine failures resulted in two forced landings. Only crew skill and fortunate circumstances kept these from becoming accidents. In each instance the compressor and turbine sections failed because of previous foreign object damage. Other mishaps occurred after cylinders separated, hydraulic and oil lines ruptured, and components malfunctioned. None of these failures resulted from materiel deficiencies.

What, then, is materiel failure? This term is not easily defined. In one publication, materiel failure is used to denote the physical failure of a structure, part, or component. In another, the same basic definition is used, but exceptions are listed. It becomes

WHY PARTS FAIL

even more difficult to define it when we consider that a part can fail to perform its function without failing materially — for example, a carburetor float valve that does not seat properly because of a burr on the valve face. A simple and adequate definition can be found in the draft revision (13 July 1967) of the Aircraft Accident Investigation Glossary prepared by the FAA National Aircraft Accident Investigation School, Oklahoma City. This definition states that a failure is a distortion, break, or separation in a structure during a loading condition imposed within its designed limits. Note ". . . *within its designed limits.*" A malfunction of a part which has not failed, but which does not function as it should during operation *within its designed limits,* can be termed a materiel *malfunction.*

Classic examples of materiel failures can be found in mishaps from a few years ago. In one instance, engineers who designed a commercial airliner were especially proud of the immense strength of the wing structure. Yet, shortly after the aircraft was placed in service, wing failures occurred. Investigation revealed that above a certain speed the normal flapping of the wings, combined with a circular movement of the engines within their mounts, exaggerated the wing movement, causing sudden and complete structural failure. In another instance, the lower tie rod end of a wing strut broke, causing the wing of a light monoplane to fold. Investigation showed that failure was induced by fatigue during normal operation, necessitating a redesign of the wing strut tie rod fitting. In neither of these instances could failure have been predicted. Mathematical computations and tests gave no hint of impending failure.

In contrast, most failures result from outside causes, such as improper handling, care, inspection, maintenance, storage, or overstresses. In each instance, the designed limits of a component are exceeded in some way. A fuel quick-disconnect comes loose because it was improperly connected; a hydraulic line ruptures because of chafing; a turbine wheel disintegrates because of previous exposure to excessive temperatures; a cylinder cracks and separates because of previous engine overboosts; a nose gear fails because improper towing procedures overstressed it; a tail rotor fails because required inspections were not performed; SAS components fail because of contaminated hydraulic fluid; engine bearings fail because dirt got into them during engine overhaul; a tire fails because of improper inflation. The list goes on and on.

Fortunately, most failures result in successful forced or precautionary landings. But some do not. The horizontal hinge pin of one blade of a UH-19 snapped, releasing the blade and causing a catastrophic accident. Analysis of recovered parts showed the pin had failed progressively, *but it had not been defective.* The rotor had been subjected to bird strikes and the aircraft had a history of hard landings, 1-1 vibration, damper problems, and blade changes.

In another instance, a CH-21 crashed after the link rod which attaches to the output of the longitudinal cyclic servo broke. The rod had been bent slightly, probably during maintenance. This slight deformation caused normal loads imposed on it to be multiplied several times, resulting in ultimate failure.

A UH-1 trunnion support broke because the trunnion attachment bolts had been overtorqued, causing the formation of microscopic cracks which spread until the support failed. Loss of UH-1 tail booms occurred after unauthorized modifications had been made to install ballast so that heavier loads than those authorized could be hauled while maintaining the c.g. within limits. All of these accidents occurred because the designed limits of the aircraft or components had been exceeded in some manner.

Actions which can result in failure or malfunction were evident in a CH-47 accident which occurred after the no. 2 engine caught fire and failed over unsuitable terrain while the gross weight of the aircraft was in excess of single engine capability. During operational checks of the engine after overhaul, the egt rose to 750°-800° for 2-3 seconds at every start. Maintenance personnel adjusted the fuel control unit,

Part failures result in more than 40% of all Army aviation mishaps. The majority are not due to inadequate design or defects in material or workmanship . . .

and even though the egt continued to rise to 750°, the engine was released and installed. Additional problems were soon evident. Engine oil was seen coming from the tailpipe, torque was difficult to control, and the N_1 would hang at 50 percent.

The oil from the tailpipe was attributed to overfilling and no corrective action was taken. Maintenance personnel adjusted the fuel control unit and tried to equalize the load between the two engines on several occasions, but were unsuccessful. The tendency of the N_1 to hang at 50 percent was compromised by recycling the engine condition lever. Although oil eventually stopped flowing from the tailpipe, none of the other discrepancies were resolved. Yet the aircraft was continued in service until the engine caught fire and failed 52 hours later. Laboratory analysis revealed:

1. The fuel control was improperly adjusted and programmed an excessive amount of fuel to the engine. A start and acceleration run of the fuel control showed 68 PPH fuel flow above normal for start and 70 PPH fuel flow above normal for acceleration. With the N_2 set against the maximum stop, the fuel flow was 280 PPH above normal. With the N_2 against the minimum stop, the fuel flow was 200 PPH above normal.
2. The N_2 power lever was found to travel from 23° (minimum stop) to 85° (maximum stop). Specifications limit the minimum stop to 13°-17° and the maximum stop to 75°.
3. Foreign object damage in compressor section.
4. A neoprene plug in the engine breather oil line.

Engine failure resulted from damage to the N_1 and N_2 power turbines, combustion chamber, and diffuser section. The improperly adjusted fuel control unit programmed excessive amounts of fuel to the engine, causing repeated high temperatures, resulting in warpage and hot spot fatigue of components. Damage was accumulative and became excessive much in advance of the normal life of the engine. FOD in the compressor housing is believed to have contributed to the high egt's by restricting the airflow. The neoprene plug inadvertently left in the engine breather oil line resulted in pressure buildups, causing the oil to overcome the seal in front of the no. 4 bearing and flow out of the tailpipe. This plug finally ruptured, allowing the pressure to equalize which stopped the loss of oil.

This premature engine failure and accident were produced by quality control personnel who permitted the fuel control and engine to be released for use, supervisory personnel who assigned inexperienced mechanics to adjust the fuel control unit and allowed the engine to remain in service without corrective action, and pilots who continued to operate the aircraft with known discrepancies.

Causes of premature part failures are numerous and varied. They include:

- Failure to replace time change items.
- Failure to perform required inspections.
- FOD due to tools, hardware, rags, paper, a host of other items, and poor housekeeping of ramps, parking areas, etc.
- Unauthorized modification of components or hardware.
- Improper torquing.
- Contamination of fuel, oil, and hydraulic systems.
- Use of critical items, such as engine bearings, after they have been dropped or damaged.
- Corrosion due to improper storage of aircraft or components.
- Damage to parts from improper use of tools.
- Failure to pre-oil engines.
- Failure to report hard landings, bird strikes, abrupt flight maneuvers, overboosts, overrevs, excessive egt's, etc., for required inspections.
- Use of unauthorized solvents to clean parts, such as short shafts.

Failures from these and other causes result in more than 40 percent of all Army aviation mishaps. Most can be prevented. The majority of part failures are not due to inadequate design or defects in material or workmanship. *They are made to happen.* The cure is simple and effective: ADEQUATE SUPERVISION for BY-THE-BOOK MAINTENANCE, INSPECTIONS, and OPERATION.

Cobra Firepower Bolstered

THE DEPARTMENT of the Army has announced that the XM-28 has been incorporated on all AH-1G HUEYCOBRA helicopters now going to Vietnam. The XM-28 is the Army's latest in helicopter armament systems.

Commanders of AH-1G units in Vietnam will have even more flexibility in delivering their firepower in the support of ground soldiers' combat actions. Manufactured by industry, under contracts awarded by the headquarters of the Army Weapons Command at Rock Island, Illinois, the XM-28 gives AH-1G crews more firepower than they've ever had before.

The XM-28 offers three possible combinations of weaponry to be mounted in the AH-1G chin turret. These include two M-134 high-rate-of-fire machineguns, two XM-129 high velocity grenade launchers, or one of each.

Additionally, each AH-1G has two armament racks under each of its stub wings. These racks can carry 7.62 millimeter automatic gun pods capable of firing 4,000 shots per minute; or either 7 or 19 tube rocket launcher firing 2.75 inch rockets. Quite a bit of firepower for just one helicopter!

But the newest part of the AH-1G's armament is the XM-28 system. Either the M-134 gun or the XM-129 grenade launcher can be quickly removed and a new or different weapon substituted. This will not only add to the helicopter's responsiveness, but should make the repair or replacement of parts much easier.

The M-134 automatic gun has six rotating barrels. It fires 7.62 millimeter rounds at rates of either 2,000 or 4,000 rounds per minute.

The XM-129 grenade launcher fires its 40 millimeter rounds at rates of 425-450 shots per minute. Its rounds are the same fragmentation projectiles used so effectively in Vietnam from helicopter-mounted grenade launchers.

The production and deployment of the XM-28 as a component of the HUEYCOBRA is conducted under the overall management of the Commodity Management office in Army Weapons Command headquarters.

Member of Aviation Test Board at Ft Rucker, Ala., makes final adjustment of chin turret of XM-28. At left is the M-134 high-rate-of-fire 7.62 millimeter machinegun. At right is the XM-129 high-velocity 40 millimeter grenade launcher

"I am going in after my men"

Mrs. Juanita Dempsey of Albuquerque, N. M., unveils memorial plaque to be erected in memory of her late husband, Colonel Jack T. Dempsey, killed in action in Vietnam. The plaque was unveiled February 2 at dedication ceremonies of Dempsey Army Heliport, Ft Wolters, Texas. Witnessing are U. S. Congressman Omar Burleson and Lieutenant General Lawrence J. Lincoln, commanding general of the Fourth U. S. Army, who both spoke at the dedication. Inscribed upon the plaque are Colonel Dempsey's last words, "I am going in after my men," a most fitting epitaph for a gallant soldier. **See article on page 9.**

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